amateur radio

SEPTEMBER, 1972

Registered at G.P.O., Melbourne, for transmission by post as a periodical Category "B"

Price 40 Cents

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

S.S.T.V.

The Mellish Reef Saga

Tuning Linears

Review, FT75

CW VOX or Break-In

F.S.K. to FT200

METERS

MO65 0-5 mA.	$3.50
MO65 100 mV.	$3.40
MO65 50 mV.	$3.40
MR2P 1,000 volt DC	$3.50
MR52 5 mA.	$3.50
MR2P 100 mA.	$3.40
P25 0-10 mA.	$3.50
P22 500 uA.	$4.00

Postage 40 Cents

"REALISTIC" DX150 SOLID STATE COMM. RECEIVER

Four bands covering 535 kHz. to 30 MHz., fully transistorised, BW/CW/SSB/AM boardcast. 240v. a.c. or 12v. d.c. operation. Product detector for SSB/CW plus fast and slow a.v.c.; variable pitch b.f.o.; illuminated electrical bandspread, fully calibrated for Amateur bands, cascode r.f. stage; a.n.l. for r.f. and a.f.; zener stabilised; o.t.l. audio; illuminated S meter; built-in monitor speaker.

Price $234.20 incl. tax

Matching speaker to suit, $13.60

STEREO ARMS

Now, complete with Ceramic Cartridge with balance weight.

Price $5.75, postage 30 Cents

MONO ARMS

Complete with Cartridge.

Price $3.00, postage 30 Cents

NEW BEZEL LAMP HOLDERS

Complete with 6-volt globes. Colours: Red, Green, White, Orange, Blue or Lemon.

Price 58 Cents each

TOGGLE SWITCHES

New DPDT Toggle Switches—C/OFF/L/R 10 amp. 125 volt or 5 amp. 240 volt ratings.

Price $2.20, postage free

RESISTORS

Poly Pack of 100 Resistors. 33 values of ½ and 1 watt rating.

Price $2.00, post paid

POCKET CRYSTAL RADIO

Type ER22. Set complete. **Price $1.50.**

VALVES

1AX2	$3.52	6DQ6A	$2.65
1B3GT (DY30)	1.77	6DT6	1.61
1F5G	1.50	6DX8 (ECL84)	1.93
1R5 (DK91)	2.25	6EH7 (EF183)	1.84
1S2 (DY86)	1.77	6EJ7 (EF184)	1.84
1S4 (DL91)	3.64	6EM5	1.62
1S5 (DAF91)	2.13	6ES6 (EF97)	2.25
1T4 (DF91)	2.13	6G8G	3.56
1U4	2.13	6GV8 (ECL85)	2.35
5AS4	1.61	6GW8 (ECL86)	2.05
5U4G/B	1.61	6H6G/T	0.50
5X4G	2.82	6K8	3.93
5Y3GT	1.38	6K8G/T	3.41
5Z3	2.82	6L6	5.05
6AB7	4.11	6M5 (EL80)	1.53
6AC7	0.50	6N3 (EY82)	1.37
6AG5	0.50	6N7GT	3.99
6AJ8 (ECH81)	2.37	6Q7G/T	2.54
6AK5 (EF95)	1.80	6S2 (EY86)	2.25
6AL3 (EY88)	1.84	6S4/A	2.32
6AL5 (EAA91)	1.39	6SJ7	0.75
6AM5 (EL91)	2.37	6SL7GT	3.18
6AM6 (EF91)	2.28	6SQ7	3.18
6AN7A (ECH80)	1.90	6U7G	0.75
6AN8	3.06	6V4	1.10
6AR7GT	2.28	6V6	3.64
6AU4GT/A	1.84	6X2 (EY51)	2.40
6AU6	1.61	6X9 (ECF200)	2.09
6AU7	2.97	6Y6G	3.13
6AU8	3.06	6Y9 (EFL200)	2.30
6AV6	1.35	12AT7 (ECC81)	0.75
6AW8A	1.93	12AU6	1.73
6AX4GT	1.84	12AU7A (ECC82)	1.72
6B8	3.88	12AX7 (ECC83)	1.95
6BD7 (EBC80)	1.30	12BE6	2.02
6BE6 (EK90)	1.68	12SN7GT	3.18
6BH5	1.61	16A5	2.15
6BV7	1.51	16A8 (PCL82)	2.46
6BW6	2.25	17Z3 (PY81)	2.25
6BW7	2.23	30	0.50
6BX6 (EF80)	1.61	KT66	6.20
6BZ6	1.61	KT88	7.05
6CA7 (EL34)	3.58	6146 (QV06-20)	7.29
6CM5 (EL36)	2.65	OA2/150C2-4	1.49
6CO6 (EF92)	2.59	OV03-12	2.34
6CO8	1.86		

LT91 RECTIFIER

20 volt 2 amp.

Price $1.50, postage 10 Cents

PRINTED CIRCUIT TAB POTS

Values available: 500 ohm, 1K, 2K, 5K, 10K, 25K, 50K, 100K, 250K, 500K ohms, 1 and 2 megohms. Type "A"

Price 32 Cents each

RONETTE CARTRIDGES

Stereo type	$7.50 postage 20 Cents
Mono type	$4.50 postage 20 Cents

NEW MR3P AMP. METERS

Complete with shunt block. Face size: 3¼ x 3 inch, m/hole 2¾ inch. Ranges in stock: 150, 125, 100, 75 and 60 amps.

Price $7.00, postage free.

CASSETTE TAPES

B.A.S.F. C60	$1.45
B.A.S.F. C90	$2.85
B.A.S.F. C120	$3.70
Goldring C60	$0.99
Goldring C90	$1.50

Postage 20 Cents

BATTERY CHARGER FOR NICKEL CADMIUM

240 volts AC to 10 volts DC
22 mA. maximum

Price $10.00

Postage 40 Cents

MULTIMETERS

MODEL C-1000 POCKET MULTIMETER

1000 ohms per volt. AC volts: 0-10, 50, 250, 1000. DC volts: 0-10, 50, 250, 1000. DC current: 0-100 mA. Resistance: 0-150K ohms (3K centre). Two colour scale. Range selector switch. Dimensions 3½ x 2¼ x 1 inch.

Price $6.75, postage 30c

MODEL 200H MULTIMETER

20,000 ohms per volt. DC volts: 0-5, 25, 50, 250, 500, 2500 (20,000 o.p.v.). AC volts: 0-15, 50, 100, 500, 1000 (10,000 o.p.v.). DC current: 50 uA., 2.5 mA., 250 mA. Resistance: 0-60K/6M ohm (scale centre 300, 30K ohm). Capacitance: 10 pF. to 0.001 uF./0.001 uF. to 0.1 uF. DB. scale: −20 dB. to plus 22 dB. Size: 4½ x 3¼ x 1⅛ inch.

Price $11.95, postage 30c

NEW MODEL US-100

Overload protection. Shockproof movement. Polarity switch. DC volts: 0-0.25, 1, 25, 10, 50, 250, 1000 (20K o.p.v.). AC volts: 0-2.5, 10, 50, 250, 1000 (5K o.p.v.). DC current: 1 mA., 25 mA., 500 mA. and 10 amp. AC current: 10 amp. Resistance: 0-50 Megohm (centre scale 50), R x 1, 10, 100, 1K, 10K. DB. scale: −20 to plus 10, plus 22, plus 35, plus 50 dB.

Price $34.50, postage 40c

NEW TELEGRAPH MORSE KEYS

Beginner's type ... $1.50 postage free

LOG BOOKS

Price 75 Cents, postage 20 Cents

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286 All Mail to be addressed to above address

Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 10.30 a.m. to 5.0 p.m., and on Saturdays to midday.

We sell and recommend Leader Test Equipment, Pioneer Stereo Equipment and Speakers, Hitachi Radio Valves and Transistor Radios, Kew Brand Meters, A. & R. Transformers and Transistor Power Supplies, Ducon Condensers, Welwyn Resistors, etc.

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910

SEPTEMBER, 1972
Vol. 40, No. 9

Published monthly, as the official journal, by the Wireless Institute of Australia. Reg. Office: Above 474 Toorak Rd., Toorak, Vic., 3142.

Enquiries and material to:
The Editor, Phone (03) 24-8652.
P.O. Box 150, Toorak, Vic., 3142.

Copy is required by the **third of each month.** Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail.

The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

Advertising:
Advertisement material should be sent direct to the Editor by **the 25th of the month preceding the month prior to publication.**

Hamads should be addressed to the Editor by the **third of each month.**

Printers:
"RICHMOND CHRONICLE"
Shakespeare Street, Richmond, Vic., 3121
Phone 42-2419.

CONTENTS

COVER

Nesting terns fly above Mellish Reef with tents and beams in the background. See "The Mellish Reef Saga" on Page 19.

QSP

In America he is called a "freeloader". In Australia we also have the person who is not a member, but demands all the services given to a member. He is the Amateur who does not contribute by his subscription to the cost of representing the Amateur Service, but believes strongly that the National Radio Society should represent his views.

He is not a member and does not go to meetings to express his views. He expects, however, to be consulted on major decisions.

He points out, rightly of course, that he is an Amateur and as such is affected as much by change as the Amateur who is a member.

If he is not consulted the W.I.A. is a dictator and naturally the onus lies on the W.I.A. to find him. He may, of course, contribute a lot to Amateur Radio. He may be an active member of a local radio club, but he is not a member of the W.I.A. Do not misunderstand me, I support the whole concept of the local radio club. It fills a need in a way that, at least in our large cities, some Divisions as presently constructed are unable to fill.

But the W.I.A. fulfills a role that no other body can undertake. It can and does speak on behalf of Amateurs across the nation.

The fact is, of course, that on issues affecting Amateurs the W.I.A. does seek the view of all Amateurs irrespective of whether they be members or not. One example is the recent discussions concerning Repeater allocations, where various meetings have been open to all.

Likewise, on matters affecting Regulations, the Institute has given full weight to all views that it has received.

But the non member can hardly complain if he does not know some fact or other, simply because it was "only published in 'Amateur Radio'."

No, the Institute does try to represent all Amateurs, not just its members. It is concerned with what is good for Amateur Radio, not merely what is good for the Institute.

It would be so much easier if all Amateurs were members. Of course it would be so much fairer, as all Amateurs would be sharing the costs.

I do not like the term "freeloader". Do you?

MICHAEL J. OWEN, VK3KI,
Federal President, W.I.A.

PIRATES

On 5th July two men were convicted of breaches of the Wireless Telegraphy Act in the Perth Court of Petty Sessions, were fined $10 each and their equipment confiscated. Subsequently, on 12th July in the Perth Children's Court similar charges against two youths were dismissed under the provisions of the Child Welfare Act though each was ordered to pay $10.20 costs and their equipment was confiscated. These cases have received extensive Press publicity in Perth, unfortunately under headlines referring to "Hams", though none of the defendants were licensed Amateurs and in each case the equipment seized operated on a frequency of 27.240 MHz.

The W.I.A. has pointed out that as the term "Ham" is generally used to refer to licensed Radio Amateurs these headlines are misleading.

COMMUNICATING EMERGENCIES

Pitcairn Island has no commercial telegraph or radio services to the outside world. The only radio link is Tom Christian's rig, VR6TC. June "QST" quotes an "informal and temporary" agreement between the U.K. and the U.S.A. permitting their Amateurs to exchange any medical, supplies and private matter traffic with VR6TC.

1973 CALL BOOK

A list of clubs, zones and groups is to be included in the 1973 Call Book along with meeting places, dates, times, Presidents and Secretaries. Would Secretaries please send in these details as early as possible please.

E.M.C.

Electromagnetic compatibility was discussed extensively (at I.A.R.U. Region 1 Conference in May), with special attention paid to the problem of obtaining proper protection for Amateur operation from the national authorities, who in some countries are reluctant to place the blame where it belongs: with the manufacturers of the entertainment equipment. (I.A.R.U. Calendar 84 of June 1972.)

EMERGENCIES

An Editorial in the Jan./March issue of the Radio and Electronics Society of India's "R.A.D.I.O." magazine commented on the recent emergency there. "It became apparent that when an emergency is imminent it is not the best time for organising emergency services." These sentiments appear universally applicable and tie in with current I.T.U. Civil Defence, Red Cross and other International thinking.

I.T.U.

The International Telecommunication Union announced the accession of the Sultanate of Oman to the Montreux Convention, thereby bringing the number of I.T.U. member countries to 142. ("Rad. Comm.," July 1972.)

W.A.R.C.

Preparation will commence immediately to deal with the possibility of a World Administrative Radio Conference in 1975-80. (I.A.R.U. Region 1 Conference, "Rad. Comm." July 1972.)

QSL CARDS

Several enquiries have come in lately for sources of QSL cards and the names of printers able to handle the production of them. Does anyone know of any printer specialising in this kind of work?

EX-G RADIO CLUB

Lawrie Kelsall, VK2AKV, writes that the Ex-G Radio Club (Australasian Chapter) now has two nets working. One on Wednesdays at 0900 hours Z on 3650 kHz., the other at 0500 hours Z on Saturdays on 14.347 MHz. called the Pacific Net.

TUNING LINEAR R.F. AMPLIFIERS

BRIAN RICHARDSON, VK3CCR*

● On numerous occasions Amateurs have expressed doubts about the correct way to tune their linear amplifiers. As there seems to be a need for a summary of the information necessary to understand what is involved in tuning an amplifier, VK3CCR has endeavoured to provide that in this article.

As we all know, the final amplifier in a s.s.b. transmitter should be capable of amplifying, without distortion, any signal fed to it from the exciter. To enable it to do this there are several circuit requirements; the principal ones being well regulated power supplies, and the correct load for the amplifying device. The power supplies are a matter of equipment design, but as the adjustment of the load is up to the operator, we shall examine this in more detail.

We shall assume that the transmitter is feeding a correctly terminated 52 ohm co-axial line. Ref. Fig. 1.

For it to deliver maximum power output and operate in a linear mode, the p.a. tube in Fig. 1 must see a resistive load equal to its own output impedance. A typical value would be 3,000 ohms. Most r.f. amplifiers use a Pi network to match the plate impedance to 52 ohms, because a Pi network acts as a parallel resonant circuit, and a variable ratio transformer. The resonant frequency is adjusted by C1 and C2 in series and the impedance transformation ratio by the ratio of XC1 to XC2.

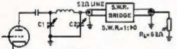


FIG 1

In Fig. 1, as the s.w.r. on the co-axial line is unity, the forward power reading on the s.w.r. bridge will indicate relative power output. If we now adjust C1 and C2 for maximum output power, the p.a. tube will be seeing the optimum load impedance as reflected by the Pi network.

With a.m. transmitters a popular method of adjusting the p.a. is to adjust C1 and C2 for a dip in anode current, experience showing how large a dip gives best results for a particular transmitter. While this method is quite satisfactory for a class C amplifier, it is not sufficiently accurate for a class AB linear amplifier, especially one employing r.f. feedback to improve linearity. The reason for this is as follows.

The plate current dip will occur at the frequency at which the output tuned circuit exhibits maximum impedance. A parallel tuned circuit which is lightly loaded and has a high Q, will exhibit maximum impedance at the same frequency at which its phase shift is zero. However, a parallel tuned circuit with a loaded Q of 10 or thereabouts, will exhibit maximum impedance at a frequency such that the phase angle between current and voltage is about 17 degrees. The correct tuning point is when the phase angle is zero, and this will be the point where maximum power output is obtained. With linear amplifiers employing r.f. feedback, if the load is tuned for a plate current dip it will appear reactive, upsetting the feedback and the amplifier will be unstable.

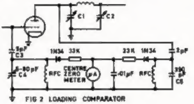


FIG 2 LOADING COMPARATOR

TUNING INDICATORS

So far we have looked at how to tune an amplifier with the only test equipment being a power measuring device. We tuned the amplifier to satisfy two requirements:

(a) To optimise the reflected load impedance, and

(b) To make the load appear resistive.

While we can tune quite accurately by adjusting for maximum power output, it is sometimes advantageous to have an indication of the state of tuning. For example, for correct adjustment of the load impedance the transmitter must be operated at full power, as the impedance varies with power level. As the p.a. tubes can easily be damaged while tuning at full power, a compromising situation may be reached. Probably many Amateurs take the safe way out and tune at low power, thereby obtaining less than optimum results. There is, however, a simple inexpensive device which will enable loading to be optimised at very low power levels. See Fig. 2.

This circuit is a comparator, comparing the relative amplitudes of the grid and anode voltages. For a given grid voltage, the anode voltage is determined by the power gain of the tube and the load resistance. If there is a change in load, the anode voltage will change. To adjust the comparator, the amplifier is carefully adjusted at full power to give optimum results, then C4 is set so that the centre zero meter is reading zero. Once balanced, this bridge will indicate zero regardless of frequency or power, as long as the tube sees the correct load impedance. In automatic systems a servo amplifier is substituted for the meter, and it would drive a motor connected to C2.

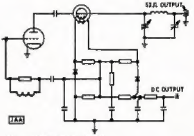


FIG 3 PHASE DISCRIMINATOR

If we wished to make the tuning fully automatic, then a circuit is required which will adjust C1 and resonate the load. Such a circuit is described in Fig. 3. This circuit is merely intended to show one approach to the problem. No component values are given, because, due to the need for close tolerance components, and effective shielding of the low level output from the high r.f. input voltages, satisfactory operation is not easily achieved. The operation of the circuit is as follows.

If the load is resistive, then the tube will have a 180 degree phase difference between the voltages on the grid and anode. A phase discriminator monitoring these voltages will give zero output. If, however, the load is reactive, then the phase difference will not be 180 degrees and the discriminator will give an output dependent on the phase angle. This can be indicated on a meter, or fed to a servo system to adjust C1. With the assistance of these circuits our transmitter can be made fully automatic, as are many commercial sets. ●

Well known in DX circles, an Indonesian businessman and an examiner for aspiring Amateurs is Kwik YB0CJ.

* 31 Jennings Street, Laverton, Vic., 3028.

A Simple Keyer

H. L. HEPBURN, VK3AFQ*

● Ever since its foundation in 1948 one of the favourites on the Moorabbin and District Radio Club's schedule of events has been the 80 metre transmitter hunt, with three or four being held each year.

So far as the equipment used on these hunts is concerned, the early years saw items of varying portability, ownership and reliability pressed into service. Since the emitted signal is keyed c.w. using the Club's call sign as identifier, a mechanical keying wheel was a very early acquisition and has been in use up to this time.

Around 1961/2 a special unit was built for transmitter hunts and consisted of a 12 volt transistorised power supply and a crystal controlled 12BY7/2E26 transmitter. It was very ruggedly built in a small physical compass and had a (relatively) low power consumption. The keying wheel on the other hand was in a box of no small dimensions and, after over twenty years' use, needed replacement with something less bulky and less current hungry.

The most obvious course to follow in replacing the keyer was to examine the feasibility of using computer techniques to generate a keying wave form. This was done, and one Club member produced a design for such a generator. However, the cost involved was judged to be excessive in terms of the use the device was liable to get and a simpler solution sought.

At the suggestion of Col VK3XV, it was decided to use a cassette recorder, fill the tape with keyed audio and then use this audio to key the transmitter. This article describes the unit that was made to operate a relay which in turn earthed the cathode of the 2E26 transmitter p.a.

Fig. 1 gives the circuit diagram. Output is taken from the earphone plug of the cassette recorder and applied across a 10 ohm load resistor. A small transistor radio output transformer is used to couple the voltage developed across the 10 ohm load resistor to the base of a simple 2N3565 audio amplifier. Note that the characteristics of the coupling transformer are quite uncritical and just about any speaker transformer (whether ex transistor or valve radio) is perfectly satisfactory so long as the low impedance winding is across the 10 ohm load resistor.

Amplified audio is then rectified by means of a diode (just about any germanium type will do) and the resultant d.c. applied to the base of a second 2N3565. The 2N3565 emitter is directly coupled to the base of a 2N3566 switching transistor. The 2N3566 has the relay coil in its collector circuit. The silicon diode across the relay coil is a "despiking" device.

With no audio at the input no voltage is present at the base of the second 2N3565 and it draws no current. No voltage is developed across the 15K emitter resistor and no voltage appears at the base of the 2N3566 relay switch. With no voltage on its base the 2N3566 draws no current and the relay is unenergised. As soon as audio appears from the tape it is amplified and rectified by the 2N3565/diode combination and d.c. appears at the second 2N3565 base, causing it to draw current. A voltage is developed across the 15K emitter resistor and causes the 2N3566 to draw current, thus energising the relay.

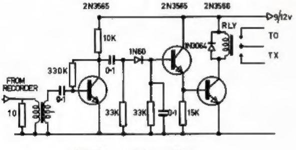


FIGURE 1 — SIMPLE KEYER

Using a $2 relay from the VK3 W.I.A. disposals committee (which had a 220 ohm coil and two sets of change-over contacts), the unit keyed admirably with a 100 mV. input from the cassette recorder.

In service the unit has proved most satisfactory and "bug" free. In the key down state the unit draws just under 60 mA. and only a milliamp. or so in the key up condition. This is a decided improvement on the amp. or so taken by the original keyer.

The whole device is built on a small strip of p.c.b. 1" wide and 4" long (including the relay) and replaces a box some 9" cube.

Whilst the next obvious step is to transistorise the complete transmitter, some problems in respect to the use of random antennae have first to be solved. Work on this aspect is in hand. ●

* 4 Elizabeth Street, East Brighton, Vic., 3187.

CW, VOX or Semi Break-In

L. H. VALE, VK5NO*

This system, which is becoming known as "semi break-in" automatically switches the transmitter on when the key is just pressed and holds it on while the key is pressed and for an adjustable period after the key is released. If this period is adjusted to be slightly longer than the space between words, the transmitter remains on during normal sending and automatically turns off shortly after sending has finished, thus saving one operation in another. It is important that the turn-on time should be as fast as possible, otherwise part of the first dot is missed; it is probably there before the other person is listening anyway.

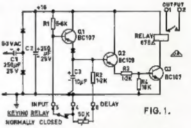


FIG. 1.

Fig. 1 is the circuit of a unit recently built here. The requirement was for the unit to be operated by a relay and for it to have relay contact output. Even though the output relay does add some delay to the turn-on time, this would probably not be more than a few milliseconds with any small relay —most of the turn-on delay would occur in the transmitter itself.

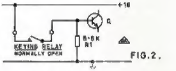


FIG. 2.

The input contacts are normally closed because these were the only contacts available in this particular case. If you wish to use normally open contacts on your keying relay, change the input circuit to that shown in Fig. 2. In either case, when the keying relay is operated the base of Q1 becomes positive, drawing the emitter positive with it. This charges C3 positively, causing Q2 and Q3 to conduct, operating the output relay. C3 is charged via Q1 and the diode. This is a very low impedance circuit and the capacitor charges rapidly. However, the capacitor can only discharge through Q2 and Q3 in parallel with R2 and the delay adjustment potentiometer. The Q2-Q3 path has more resistance than the other so that the turn

(Continued on Page 10)

* 29 Calton Road, Gawler, S.A., 5118.

ELECTRICAL MEASURING INSTRUMENTS

LECTURE 15D

C. A. CULLINAN,* VK3AXU

• Concluding the series of lectures by C. A. Cullinan, VK3AXU, at Broadcast Station 3CS for students studying for a P.M.G. Radio Operator's Certificate.

ELECTRICITY SUPPLY METERS

Sometimes it is necessary for a radio man to have some knowledge of electricity supply meters. For instance, a radio station may share an a.c. generating plant with another organisation and finds that it is desirable to know how much of the generated power should be charged to the two users, also reference has been made earlier to the occasions when a radio station's generating plant has been used to assist a supply authority in an emergency.

Therefore it is proposed to give some information on the basic principles used in measuring the amount of electrical energy taken by a consumer.

Power supply authorities may be divided into broad groups as follows:

- State (government owned).
- Semi-government owned (councils, shires, municipalities, counties and similar bodies).
- Private enterprise owned.
- Community owned.

(The latter refers to a small group of people which install a power generating plant and does not operate it for profit. These people may pay a sum of money at intervals to meet costs, but to keep down costs may not use any form of energy metering. This group will not be referred to again.)

In many cases semi-government and private enterprise may purchase the whole or part of their power from another supplier and may retail it to their consumers and they may adopt different metering methods to those of the original supplier.

Unfortunately on a world-wide basis there are considerable differences in the approach to power generation, distribution and methods of charging the consumer for the energy used, and this state of affairs exists in Australia as well as elsewhere.

There are two types of power generation, direct current (d.c.) or alternating current (a.c.). For many years d.c. was the predominant type, then a.c. began to take over from d.c., but in recent years there has been a swing back to d.c. mainly for very high voltage long distance transmission because it is more economical than a.c. even although it has to be converted from a.c. to d.c. at the sending end then re-converted back at the receiving point.

It is becoming commonplace for Australian broadcasting and television stations to send staff overseas to make programmes and because of the differences that exist in broadcasting, t.v., and power supplies, the stations may send their own equipment, with conversion plant, rather than make use of the overseas equipment. One thing that must be known beforehand is the type, voltage and if a.c., the frequency of the power to be used, assuming that there is any available.

For instance, when a member of the 3CS staff was going to S.E. Asia it was necessary to find out such details and great assistance was given by the Commonwealth Dept. of Trade, in Melbourne.

On a world-wide basis a few countries use d.c. only, whilst many have a mixture of a.c. and d.c., and to add to the confusion there may be large differences in voltages and frequencies. One country, in the latest list available to the writer, shows six different d.c. voltages and nine a.c. voltages and not all of these have the same frequency.

Again on a world-wide basis, a.c. frequencies may be 25, 42, 43, 45, 50, 60 or 100 Hertz.

Great Britain has adopted a policy of unifying electrical distribution systems with d.c. and a.c. voltages (r.m.s.) at 230 volts and the standard a.c. frequency is to be 50 Hertz.

Here in Australia we have seen the conversion of equipment in Western Australia from 40 Hz. to 50 Hz., and it is understood that the City of Melbourne has completed the conversion of its supply and distribution from d.c. to a.c.

Now all power supply authorities have to obtain their primary source of energy from somewhere. This source may be expensive or it may be very cheap, but irrespective of its cost, there are also the matters of plant, staff, maintenance and other costs to be considered in working out the tariff to be charged to the consumer.

In a.c. systems one of the hidden costs is that caused by "power factor" in the overall load because the "wattless" power caused by power factor has to be generated and passed through the distribution system.

The approach by power supply authorities to power factor differs greatly. Here are some examples.

One authority takes the average power factor of its load as being 0.8 and in working out its tariff **adds in an allowance to cover this power factor.** This authority does not demand power factor correction by consumers, and does not make any rebate if a consumer does make use of power factor correction equipment in his plant.

One fairly large authority generates approximately 3,500 megawatts of power (apparent) using a rather expensive primary source of power. If we assume that the power factor of the load is 0.8, then the true power consumed by the load is 3,500 × 0.8 = 2,800 megawatts, then 700 megawatts of unusable power has to be generated, and distributed, then paid for ultimately by the consumer because the tariff includes an amount (rate) to cover the cost of the "wattless power" although the consumer is probably not aware of this.

On the other hand, in order to reduce the waste of primary energy some authorities adopt different approaches, one of which may be the use of special watt-hour meters which register the total or apparent power taken by the load.

Yet another large authority encourages its customers to install power-factor correction and makes a slight rebate. Sometimes the capital cost of the p.f. correction equipment is recouped in two years, then starts to show a profit.

The usual form of power-factor correction is to connect static condensers in parallel with the load. In practically all cases of low power factor the cause is lagging current in the load and is corrected by injecting leading current into the system so that the inductive portion of the load is neutralised by a capacitive load. It is rather rare to find a consumer with loading power factor in his load and I doubt that any authority would ask for correction of this as it would be helping to correct the lagging power factor in the authority's system.

In many power stations it is the practice to run one or more synchronous motors with little or no load, as such a motor takes leading current, if over-excited, thus these motors inject leading current into the system to help neutralise the general lagging current caused by a power factor which is less than unity.

Such motors are known as "synchronous condensers".

In most cases, too, the a.c. generators, if operated into a resistive load, would have a lagging power factor, because of the inductance of the generator windings, and synchronous condensers may be used in a power station to ensure that as far as the power station is concerned the power factor of the power leaving the station will be unity if operated into a purely resistive load.

Normally it is not practical for a consumer to install synchronous condensers so fixed condensers, known in the electrical trade as "static condensers," are used.

The capacitance required is given by the formula:—

$$C \text{ in } \mu F. = \frac{K.V.A. \times 10_6}{2 \pi f \times V^2}$$

where K.V.A. is the output of the capacitor in kilo-volt-amperes, f is the frequency, and V is the voltage.

* 6 Adrian Street, Colac, Vic., 3250.

For example a set of three-phase condensers for 100 K.V.A., 600 volts, 50 Hertz, would have a capacity of 295 micro-farads per phase, or 885 μF. total capacity.

Then for another example there is a very large authority, using very expensive primary energy, which requires all industrial consumers to have a power factor of 0.95 or better and takes steps to penalise those who cannot reach 0.95.

Electricity supply meters fall into two main classes, that for measurement of the electrical energy used by a consumer in a d.c. system, and that for the electrical energy consumed in an a.c. system.

The power supply authority wants to know how much electrical energy (power) was consumed over a period of time. Therefore it is the usual practice to install for each consumer what are known as "watt-hour meters," which are integrating meters.

In Australia the unit of electrical energy is the kilowatt-hour, i.e. one kilowatt of energy consumed over a period of one hour is one unit.

It must be realised that the meter registers only when power is flowing into the load to which it is connected as the object of using the meter is to obtain the sum of the electrical energy used over any period of time. Some authorities charge a rental for the meter and some of them refund the rental charge if a certain amount of power has been consumed over a definite period of time.

D.C. Watt-Hour Meters

There are two types known to the writer. One of these is a special type of electric motor having both voltage and current coils, with the armature driving a train of gears to which are attached registering dials or pointers. Compensation is made in the meter for the friction losses in the bearings and gears. The energy shown on the dials is the product of the voltage and the current. It is usual for the dials to be calibrated in decades.

The second type is, strictly speaking, an "ampere-hour meter" as it measures only the current flowing through it, the voltage being assumed to be constant.

In this type a disc of copper is rigidly attached to a vertical spindle, near the top of which is cut a worm to drive a train of gears which operate the registering device, such as decade dials or pointers. The disc rotates in a mercury bath. A very powerful permanent magnet is arranged so that its pole-pieces almost touch the disc above and below it. The pole-pieces are insulated from the mercury, which in turn is insulated from the rest of the instrument.

Current is fed into the mercury on one side of the instrument, through the mercury, which has a relatively high resistance, then through the low resistance of the copper disc, to the mercury on the other side of the disc. Because the disc has far lower resistance than the mercury, very little current flows from one side of the instrument to the other through the mercury.

As the current flows through the copper disc, the latter rotates owing to the fundamental action by which torque is produced when a current flows at right angles through a magnetic field.

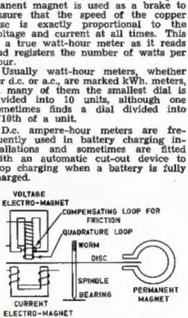
In some meters of this type the current flows through a small coil wound on an iron core and this is adjusted to compensate for the friction losses in the meter.

Such a meter may be calibrated to read in "ampere-hours, or in watts when it must be used only on the voltage for which it was calibrated.

There is a variation of this type of meter in which a U shaped electromagnet is mounted immediately below the copper disc. The magnetic circuit is completed by an iron ring immediately above the copper disc and the pole faces of the electro-magnet. The electro-magnet is connected across the d.c. line, thus it is a voltage or pressure magnet. Compensation is used to overcome friction losses. Also a small permanent magnet is used as a brake to ensure that the speed of the copper disc is exactly proportional to the voltage and current at all times. This is a true watt-hour meter as it reads and registers the number of watts per hour.

Usually watt-hour meters, whether for d.c. or a.c., are marked kWh. meters, in many of them the smallest dial is divided into 10 units, although one sometimes finds a dial divided into 1/10th of a unit.

D.c. ampere-hour meters are frequently used in battery charging installations and sometimes are fitted with an automatic cut-out device to stop charging when a battery is fully charged.



BASIC INDUCTION TYPE OF SINGLE-PHASE A.C. WATT-HOUR METER

FOR CLARITY IN DRAWING ONLY ONE OF THE PERMANENT MAGNETS HAS BEEN SHOWN. NOTE THAT THE CENTRE POLE OF THE VOLTAGE COIL IS LONGER THAN THE OUTER LEGS.

FIG. 16

A.C. Electricity Supply Meters

Throughout the world the induction-disc principle is being adopted as the basic pattern for all types of integrating meters as watt-hour meters in a.c. systems.

Although the basic principle is used there are many variations in design by different manufacturers and there are many designs for specific purposes.

In the basic single-phase watt-hour meter a disc, usually of aluminium, is rigidly attached to a vertical spindle which runs in low-friction bearings. At the top of the spindle a worm is cut to drive a train of gears to operate dials, pointers or a digital read-out.

The digital or cyclometer type of read-out is easier to read and is replacing the older types of dial and pointers although the friction loss is higher, thus one of the important aspects in the design of electricity supply meters is to ensure that each meter consumes a minimum of power, therefore all possible attempts are made to reduce frictional losses to a minimum. Typical watt-hour meters have a driving torque of 10 to 15 g/cm. at marked load watts. With the use of light alloy wheels, burnished pivots and the choice of dissimilar metals for the bearings, the friction losses can be kept to below 0.5% at 1/60th of the maximum load. As stated earlier, the cyclometer type has slightly more friction.

In the basic type of induction watt-hour meter there are two electro-magnets and usually two permanent magnets.

One of the electro-magnets uses a number of E type stampings for the core with the centre pole projecting slightly further than the outside legs. A coil of many turns of fine wire is wound around the centre leg and is connected across the power line as a voltage or pressure coil. Small leakage gaps ensure that the electro-magnet is highly inductive. This electro-magnet is mounted just above the aluminium disc.

Below the disc, and below the position of the voltage electro-magnet is mounted a current electro-magnet. This is made of U shaped stampings and has a coil of a few turns of very heavy gauge wire on each leg. These coils are wired in series. This electro-magnet is connected in series with one leg of the power line so that all the current passes through it. The coils of this electro-magnet have very little inductance so that the current is virtually in phase with the voltage.

Now as the voltage coil is highly inductive, the current in it will lag almost 90° behind the voltage.

The magnetic flux produced in the voltage pole lags in phase approximately 90° behind the voltage whilst the magnetic flux produced in the current coils is virtually in phase with the voltage but is of opposite polarity.

The flux of the voltage coil is therefore approximately 90° behind the flux of the current coil and the reaction between them causes eddy-currents to be produced in the aluminium disc and these produce a driving torque which is proportional to the power which is flowing, therefore the disc rotates.

However it is impossible to make the voltage coil so that the current flowing in it will be exactly 90° lagging behind the applied voltage, therefore some method of compensation must be used.

This is known as quadrature or power factor adjustment. Frequently it consists of a short-circuited turn of copper wire which is placed over the end of the pole of the voltage electro-magnet. Alternatively strips of copper are placed in the magnetic circuit or several turns of wire are wound around the centre pole, as near to the alumin-

ium disc as possible. A variable resistance is connected across the ends of this coil and adjustment for power-factor compensation made by adjusting the resistor.

When initial adjustments of a completed meter are made it is usual to test with normal voltage at 100% full load current at zero power factor, lagging. The quadrature adjustment is made so that the disc remains stationary. The meters are checked again for either 0.5 lagging p.f. or any other power factor that the purchaser may specify. If the initial adjustment has been done correctly, then the meter will register "true power" irrespective of the power factor of the load.

Special generators are available in which the angle between voltage and current may be varied from 90° to zero degrees so that any power factor may be duplicated when the watt-hour meter is loaded with a non-reactive load.

Compensation for friction may be obtained by placing one or more short-circuited loops in the leakage air-gaps of the voltage electro-magnet.

One of the problems of this type of meter is that the speed of the rotor (disc) may not be exactly proportional to kilowatt hours. Therefore it is usual to place one or two permanent magnets in suitable positions with their pole-pieces above and below the disc. As the disc rotates between the poles of the magnets an e.m.f. is produced which is equal to the flux cut per second and this produces eddy-currents which co-act with the permanent magnet flux to make a retarding torque on the disc. This breaking torque increases in direct proportion to the speed of the disc and in square relation to the flux.

As the result of proper positioning of the permanent magnets the disc revolves at the correct speed for all values of power.

Another correction to be applied to the meter is the low-load adjustment. The disc must not revolve if no current is flowing in the current coils whilst the voltage coil is energised. In the usual application the voltage coil is continuously across the line, whilst the current coils are in series with the line and current flows through them only when the load is connected. This is a generalised statement as in some cases the current taken by the voltage coil passes through the current coils in which case the low-load adjustment takes this into consideration.

On the other hand the disc must revolve when only a small current flows in the current coils.

Temperature compensation may be included as well.

The three main adjustments for calibration are:—

(a) Full-load speed, adjusted by the brake magnets.

(b) Quadrature, to obtain 90° phase difference between the two driving fluxes.

(c) Low-load adjustment.

Watt-hour meters cannot be tampered with, without the tampering being obvious.

Poly-Phase Watt-Hour Meters

Again there are considerable variations in design by various manufacturers.

In one type a single disc is used, with two meter assemblies opposite each other. In this type a circular piece of glass is bonded to the vertical spindle and the aluminium disc is spun on to the outside edge of the glass.

In another type two watt-hour meter assemblies are mounted one above the other, but using a common spindle.

As mentioned earlier some power supply authorities require the consumer to have a power factor of 0.95 or better.

As the types of watt-hour meters just described do not register the reactive power caused by power factor, because of the quadrature adjustment, and the design of the voltage electromagnet, another type of watt-hour meter is used.

This is a KVArh meter, meaning kilo-volt amperes reactive hour meter.

A simple direct method of measuring K.V.A. has not been discovered. If the voltage remains constant, then a measurement of the current may be considered as proportional to K.V.A. Alternatively if the power factor of the load can be maintained at a constant value, then it is possible to calibrate a quadrature adjusted watt-hour meter to register the "apparent power" by over-compensating the quadrature adjustment.

METERS DESIGNED TO MEASURE K.V.A.

This type of meter, which may frequently be referred to as a watt-hour meter, mechanically combines the readings of a kWh meter and a KVArh meter by means of complicated gearing and certainly is not a simple device.

The KVArh meter registers the reactive component of the power. This meter is similar to the previously described watt-hour meter (quadrature adjusted) except that it has a voltage element with the current and voltage in phase so that the flux in the voltage electro-magnet is in phase with the flux of the current electro-magnet and produces a torque which is proportional to VI sin ϕ.

If for any reason the power factor is leading then the connections to the voltage coil are changed automatically.

The KVA meter registers the "total" or "apparent" power used by the consumer, hence the consumer has to pay for the "wattless" power in his load as well as the "true power", and as he does not get any work from the "wattless power" he will soon do something to improve the power factor of his load in order to reduce his costs.

There are a number of varieties of both single and poly-phase watt-hour meters. These include pre-payment, or "coin-in-the-slot", also dual-rate meters. For instance, one authority will allow an industrial user a lower tariff between 11.30 p.m. and 7 a.m. the next day. The watt-hour meter is fitted with two registers. At 11.30 p.m. an electric time-clock switch will change the gearing in the watt-hour meter from the normal rate to the lower one until 7 a.m. following morning.

ELECTROLYTIC METERS

There are several different types, but they will not be described as it is considered unlikely that they will be encountered in radio work.

PRIMARY SOURCES OF ENERGY

Finally, it may be of interest to compare some sources of primary energy and a fine article on this appeared in the July 1970 A.N.Z. Bank Quarterly, "Survey".

Hydro-electric, direct solar, wind, tidal and geo-thermal sources were not considered as they represent only a very small contribution on a world scale.

In the list of energy contents of typical fuels, we quote the two extremes:

Brown coal: 9.2-9.9 million BTUs per long ton.

Uranium oxide in fast-breeder reactor: 46,000,000 million BTUs per long ton. ●

ACKNOWLEDGMENTS

In concluding this series of lectures, I would like to thank the many readers of "Amateur Radio" who have expressed to me personally their appreciation of the series and to "A.R." for publishing them.

I would also like to thank the following people who assisted in the typing and checking of the lectures, as without this assistance it may not have been possible to submit the series for publication as they existed only in my somewhat illegible handwriting.

Misses J. Black, J. Glenister, H. Haycroft, B.Sc.; Messrs. M. P. Black, A. Gray, W. Titheradge, also Associated Broadcasting Services Ltd., for their permission to submit the series to "A.R."

S.S.T.V.

JOHN WILSON, VK3LM/T*

• Over the last six months, the growth rate of S.S.T.V. has been rapid. Up to 300 letters and STD calls have been received from all over VK and ZL enquiring about components, circuits, tubes and many other aspects of S.S.T.V.

A Slow Scan Group has been formed in VK3 under the auspices of the Eastern and Mountain District Radio Club (E.M.D.R.C.) and meets every second Friday evening in the month at the Mooroolbark Technical School, Reay Road, Mooroolbark. The average attendance at these meetings has been 35-40 and all Amateurs and S.w.l's are welcome to attend.

The Group has made available an s.s.t.v. alignment tape which contains signals from an s.s.t.v. generator and includes black and grey scales, sync. information, linearity patterns and pictures of average contrast including some cartoon line work. The tape runs for 35 minutes and can be recorded for any interested person. Details are given at the conclusion of this article.

The E.M.D.R.C. has made available components, boards and tubes for slow scan builders and as for the tubes, they can supply 8" or 11" tubes re-gunned and re-phosphored in either P7 or E26 phosphor.

The P7 phosphor is the normal long persistence phosphor in green and can be used for both black and white and high quality multi-colour pictures.

The E26 phosphor is a special coating of white (P4) and P26 applied to the tube in such a way as to alter the tube characteristics to enable daylight viewing or direct viewing under normal room light conditions. With this tube the phosphor cannot be activated by room light but only from the electron beam within the tube. The P7 type, however, must be viewed under low room lighting levels. Having the 8" or 11" tubes available has enabled the builder to have a larger screen on his monitor.

The disadvantage of the disposal type tubes is their diameter, resulting in smaller pictures and on many occasions, lower light output coupled with lower contrast. Most of the disposal tube sources have dried up and the prices of the few still available have been elevated to a ridiculous level.

Letters arriving from the VK4 and VK2 areas indicate that some components are difficult to obtain in the country areas—some claim that even some transistor type numbers are unheard of. However, because we are dealing with low frequencies almost any three-legged device can be used. Other items reported scarce in the north are t.v. yokes and oscillator coils.

Since publication of the previous construction article, I have tried all types of t.v yoke assemblies and have found that all types will work. Experimentation with correct linearity and size will have to be done by each constructor.

In the early article, iron cored yokes were specified, such as those used in the old Bush Simpson, Classic, etc. The reason these were selected is because of the **low scanning currents** required to give normal deflection. This resulted in lower current transistors being required in the output circuits. Using other type yokes may require output circuit transistors capable of handling higher scanning currents (e.g. in the order of positive 800 to negative 800 milliamperes).

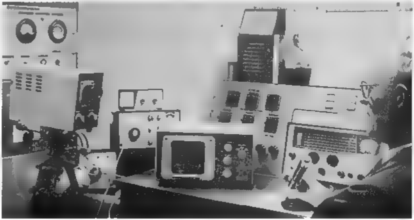
Printed circuit boards have been developed for the VK4NP monitor. Norm's monitor runs parallel with the W9LUO described in "A.R." of March, 1972—the basic difference being the mono-stable multivibrators used in both frame and line circuits. Boards can be obtained from the E.M.D.R.C. (details given at the conclusion of this article).

excellent and this monitor can provide excellent colour pictures for those wishing to have a go at colour s.s.t.v. Further information on this type of equipment can be obtained from Stan Dixon, VK3TE, 73 Cole St., Elwood, Vic., 3184, phone 96-1877, or by contacting the author. (See photograph of Stan at the controls of his "Robot".)

S.S.T.V. FLYING SPOT SCANNERS VERSUS S.S.T.V. CAMERA

Many operators have built the flying spot scanner in preference to the s.s.t.v camera. The basic reason here lies in the availability of the basic hardware and major components.

Probably for versatility, the camera is the most practical answer as you can shoot live any picture or title card that may be on hand. The most practical solution is to use a standard fast scan camera fitted with fast scan output into a conventional t.v. receiver.



Stan VK3TE at the controls of his "Robot" camera and monitor. This camera has facilities for fast scan output, a good feature for rapid focus and set-up.

OTHER TYPES OF S.S.T.V. MONITORS

Several people have constructed, or are in the process of constructing, monitors of other design. Some have been home designed around disposal indicator units, whilst others are quite sophisticated. I know of about four or five people building the Mike Tallen "MXV" monitor and would certainly be interested to receive reports on s.s.t.v. equipment that you have constructed or are using. Many other people are interested in this field, but are unable to make up their minds whether to build or buy.

On the market in VK3 is the American s.s.t.v. camera and monitor known as the "Robot," which uses 10 integrated circuits and about 23 transistors and 15 diodes. The c.r.o. tube is a 9" rectangular t.v. type tube with P7 phosphor and orange filter. Picture detail, contrast and linearity are all

Construction of a fast scan to slow scan converter board using sampling techniques allows us to have a fast scan camera with slow scan output for direct transmissions.

By the above method, rapid setup facilities are available to the operator, instant focus changes, etc., being seen on the fast scan monitor. Using the normal slow scan camera results in a longer setup time for focus, etc., due to the length of time required to produce a single frame on the monitor.

The flying spot scanner is the next alternative to a live camera. Here negatives, positives or photo prints can be installed into the carrier and direct scanning of these prints is available. Clear sheets can be used and instant drawings or written comments made and inserted into the scanner.

Which type of scanner is the best? The direct scan through a negative or positive piece of film or the reflective

* 14 Merrilong Street, Ringwood East, Vic., 3135.

type where the scan is reflected from the print to the photomultipliers? Well, both look good and you will hear the boys argue for hours on this subject. Why not try it for yourself?

One very good device to fit to your camera or scanner is a switch to enable you to—

(a) Reverse scan, e.g. right to left.

(b) Reverse colour, e.g. was white on black, now switch to black on white.

Under some poor conditions, white letters on a black background are more easy to identify, showing less noise lines and adjacent channel interference. As for reverse scan, the uses for this are left to the imagination of the operator. Have you ever watched the weather map on GTV9, then you will know what I mean.

ACTIVE SLOW SCANNERS IN VK

A slow scan net has been established by Barry VK5BS and is held on Sunday morning at 0100z on 14230 MHz. If you are a slow scanner and don't operate too regularly, then come up on Sunday mornings.

Detailed below is a list of known active slow scanners on the h.f. bands in VK and ZL—

VK2GR	VK3AQL	VK6CS
VK2BRA	VK3ARD	VK6ES
VK3EG	VK3YEO*	VK7JV
VK3LM	VK4NP	VK7TB
VK3PB	VK4XY	VK8CW
VK3TE	VK5BS	VK8KK
VK3ABM	VK5MF	ZL1DW
VK3AMC		ZL1AOY

* v.h.f. only

SLOW SCAN HANDBOOK

The first edition of the Slow Scan Handbook has come off the press at "73" Magazine and contains many construction articles and much information relating to slow scan that has not previously appeared in print.

At the time of writing, we have not received our copy, but will review it when it arrives per "A.R." The book is written by Don C. Miller, W9NTP, and Ralph Taggart, WB8DQT, and sells in the United States for $4.95 paperback or $6.95 in a hard cover. [This will become available through the W.I.A. at an early date.—Ed.]

SLOW SCAN COLOUR

The first Australia-to-United States of America two-way s.s.t.v. colour transmission took place on 6th June, 1972, between Bill W2DD in Fairport, State of New York, and John VK3LM in Ringwood East, Victoria.

To the best of our knowledge, this contact is not only the first W to VK, but the first continent to continent in colour on s.s.t.v.

Other colour transmissions have been used in U.S.A. since 1969.

I have since transmitted slow scan colour to Doug VK8KK, Norm VK4NP, Barry VK5BS and Ian ZL1AOY. I am on the look out for any Amateur interested in a two-way colour contact.

Lengthy articles on the production of colour slow scan have appeared in both "73" Magazine and "Ham Radio". The process is quite long and requires a good sound knowledge of colour techniques and photography. Under closed circuit conditions the picture detail and resolution is fantastic. Using a good colour film such as Ektachrome or similar colour, balance is excellent.

To enable you to produce colour s.s.t.v., your c.r.o. tube phosphor must be capable of reproducing red, blue and green as a deficiency in any of these areas will result in lack of colour in that particular region.

An up-to-the-minute report on colour s.s.t.v. is being published by Bill W2DD and should appear in "CQ" Sept., 1972. Details on how to transmit, receive and produce colour frames will be given. (Previously published data on colour is given at the conclusion of this article.)

We would like to contact interested Amateurs willing to tackle colour s.s.t.v. experiments. This will then enable other colour s.s.t.v'ers, both here and overseas, to have two-way contacts with VKs and ZLs in colour.

Similar colour transmissions took place between the moon and the U.S.A. on one of the recent manned space operations.

WILL S.S.T.V. REMAIN ALIVE LIKE S.S.B.?

We would certainly like s.s.t.v. to become as popular as s.s.b., however this can only happen if you, the interested Amateur, comes up on the band calling "CQ SSTV".

In the U.S.A., about 800 to 1,000 operators exist on s.s.t.v. and interest is actively growing in G, SM, VK, ZL, PA, F and many other countries. Already some JA operators have equipment viewing pictures and are waiting for their government to give the green light for transmission of s.s.t.v.

If you are interested in receiving more information about s.s.t.v., just write to me. The E.M.D.R.C. can supply circuits, reprints of s.s.t.v. articles, components, etc.—in fact any help or information available on s.s.t.v. Also, if you would like to see slow scan news regularly in "A.R.," drop me a line giving details of your activities and equipment (including photos). I am also interested in photos of outstanding or interesting pictures received on your monitor. ●

GENERAL INFORMATION

Alignment Tape

Send tape and speed required (reel to reel) or cassette to E.M.D.R.C. (Return postage cost should be included.) Running time, 25 minutes.

Printed Circuit Boards

For monitor in "A.R." and Norm VK4NP's version of "A.R." monitor.

Articles on S.S.T.V. Colour

"Ham Radio," Dec. 1969; "73" Magazine, Nov. 1969; "73," May and June 1970; "CQ," Sept. 1972.

Address correspondence to the Slow Scan Group, C/o. E.M.D.R.C., P.O. Box 87, Mitcham, Vic., 3132.

Acknowledgments

To my wife, Joan, typing; Jack Smith of Ringwood, photography; William H. De Witt, Fairport, N.Y., W2DD.

CW, VOX or Semi Break-In

(Continued from Page 4)

off time depends upon the setting of the potentiometer and is adjustable to almost a second, which is more than sufficient.

The power supply enables a 6.3 volt filament winding to be used as the primary power supply; almost any type of power rectifier can be used. The diode at the emitter of Q1 can be a power type also—the only requirement is that it can handle a peak current of up to 500 mA.

If it is required to operate the unit directly from a change in voltage such as that available from a keyer, it is suggested that a 741 operational amplifier be used to drive Q1. A choice of op. amp. inputs and bias resistors should enable almost any input conditions to be accommodated. ●

PRE-1940 CONVENTIONS

At Springwood, Blue Mountains (N.S.W.), in May 1972, members of the 1935-1938 W.I.A. Federal Executive gathered with their wives for a re-union. Some members had not met for over thirty years. F.H.Q. at that stage was located in Sydney. The re-union was organised by VK2VN and all members of the then F.E. were present.

The Divisional Delegates to the 14th Annual Federal Convention of the W.I.A., held in Sydney in 1938, were Wal Ryan, VK2TI, Vaughan Marshall, VK3UK, Arthur Walz, VK-4AW; Doc Barbier, VK5MD; George Moss, VK6GM, and Jack Batchler, VK7JB. Representing N.Z.A.R.T. was their President George Petrie, ZL2OV. That Convention was part of the World Radio Convention conducted by the I.R.E. and was officially opened by John Logie Baird, t.v. pioneer, after receiving a welcome from Sir Ernest Fisk, President of the I.R.E. and Past President of the W.I.A. N.S.W. Division. This Convention was financed by the N.S.W. Government as part of the 1938 Sesqui-Centenary Celebrations.

Left to right: Federal President Bill Moore, VK2HZ; Federal Secretary, Harry Caldecott, VK2DA, Ron Cohen, VK2TF; Eric Colyer, VK2BEL (ex VK2EL), Morrie Meyers, VK2VN Peter Adams, VK2JX.

ADDING F.S.K. TO THE FT200

GEO. FRANCIS,* VK3ASV

● It is a very simple matter to add FSK to your very popular FT200 Transceiver, without changing the circuit or printed boards in any way, thus not affecting the re-sale value.

The method[1] used to key the transmitter by shifting the frequency of the v.f.o. is to make use of the existing clarifier varicap diode normally used for the receiver offset tuning. This article deals specifically with the FT200 but could be applied to other transceivers with similar circuitry.

The receiver clarifier control VR6 allows the receiver frequency to be offset from the transmit frequency by up to ±5 kHz. if required, by controlling the d.c. voltage on the varicap diode 1S145 (D401) on the v.f.o. board. Incidentally, the source of this voltage is from the 9v. regulator board. Normally, during transmit, the bias on the varicap diode is taken from the centre connection of the voltage divider R39 and R40 so that the transmit frequency is not varied by the setting of the clarifier control. This is automatically done by the send/receive change-over relay contacts PL1.

When the clarifier is switched in for receiving, another voltage divider network comprising R37, VR6, R38 and VR7 is paralleled with R39 and R40 (see Fig. 1). The circuit to be added is actually another voltage divider in parallel externally (in the f.s.k. adaptor) that shifts the v.f.o. during r.t.t.y. operation, using the internal varicap D401, in such a way as to allow the "receiver offset tuning" (or clarifier) and the "frequency shift" adjustment to remain as completely independent controls.

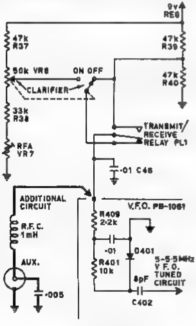


FIG 1
FT200 CLARIFIER CIRCUIT

* 31 Donald Street, Morwell, Vic., 3840.

TRANSCEIVER MODIFICATION

Lay the cabinet on its left side on a piece of felt and remove five PK screws and washers from the bottom of the cabinet. Slide the cabinet away from the chassis, out forwards, and place the chassis bottom side up on the bench.

Now checking Fig. 1, the simple "modification" (shown in heavy lines) is simply to mount an R.C.A. phono-socket (chassis type) in the vacant hole at the rear of the chassis marked "Aux," mount a single or double tag strip at the socket, solder the r.f. choke between the centre connection of the socket and tag strip, and by-pass the centre of the socket to earth with the disc ceramic condenser (to by-pass any strong r.f. going past the socket in either direction).

Run a short length of hook-up wire from the tag strip at the other end of the r.f. choke round and up through the chassis to the clarifier connection on the side of the v.f.o. box as per Fig. 2.

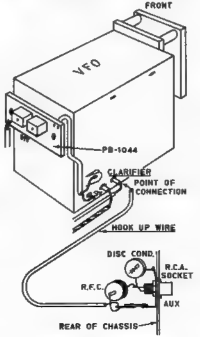


FIG 2
FT 200 V.F.O. CONNECTIONS

There are no component changes to the FT200. This completes the transceiver "modification". The control box may now be assembled. The transceiver v.f.o. alignment is not affected.

F.S.K. ADAPTOR

The f.s.k. adaptor control box can be contained in a die-cast box or similar. The 500K pot. and the d.p.d.t. switch are mounted on the front of the box, and three jacks are mounted on the rear. See Fig. 3 for the circuit. Wiring is not critical, as we are dealing only with switching of d.c. potentials. Suitable patching cables, preferably shielded, must be made up to match your choice of jacks.

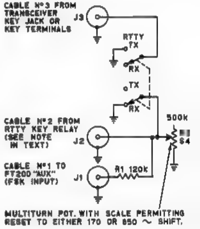


FIG 3
CONTROL BOX CIRCUIT

Cable No. 1 from J1 on the control box runs to the FT200 "Aux." socket just fitted for frequency shift (f.s.k.). Cable No. 2 runs from J2 to the r.t.t.y. transmit keyer.

Warning Note. This circuit should be keyed only by a polar, keying or mercury relay, or directly from the keyboard alone. **Do not** attempt to key directly from the normal d.c. loop to the printer magnets. Any voltage on the key line may damage S145 diode.

See Fig. 4 for a suitable keying circuit. The author used a plug-in "keying" relay from a Wireless Set No. 11 (similar outwardly to a Ferrocart vibrator).

Cable No. 3 from J3 may be plugged into the FT200 key jack, or can be clipped across the c.w. key terminals at the key.

ALIGNMENT

Alignment of the control circuit is merely a matter of setting the shift pot., R2, for the desired frequency shift.

(Continued on next page,

With the FT200, this adjustment will hold for all bands as the v.f.o. is of the heterodyne type.

With all the patching cables connected, turn on the transceiver and check the receiver for proper operation. Whilst the plug is in the "Aux." jack, the transceiver "Cal." locking knob has to be used to re-set dial calibration in conjunction with the 100 kHz. calibrator, as per instruction handbook on page 6.

Tune up the transmitter as you normally would for a.m. operation, as c.w. operation would exceed the rated 150 mA. plate current. I use a small fan at the rear of the FT200 for f.s.k. and a.m. operation to circulate air around the final tubes. Even during long transmissions no overheating takes place. Remember that r.t.t.y. is continuous carrier, or key-down operation, and things will run very warm indeed unless you provide for increased cooling.

After the transmitter is tuned, throw the switch on the f.s.k. control box to r.t.t.y. transmit position. The transmitter should now be keyed, and the plate current should be the same value that you adjusted for earlier. The frequency shift should now be adjusted by opening and closing the r.t.t.y. key line to the control box J2 and adjusting R2 to the standard wide 850 cycle shift, or the narrow 170 cycle shift.

Use a good quality pot. for the shift control, such as a ten-turn precision potentiometer with a counter dial to allow high accuracy set and re-set. These are now available in Australia.

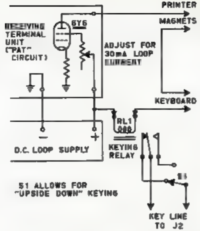


FIG 4
KEYING CIRCUIT

If you want to use the FT200 transceiver without the r.t.t.y. control box, make up a jumper plug consisting of a R.C.A. phono plug with a 120K 5% resistor connected from the centre pin to the plug case, or ground. Simply insert this in this f.s.k. jack ("Aux.") on the rear of the transceiver. The jumper plug maintains v.f.o. alignment.

This arrangement has been in use here for nearly a year and enjoyable contacts have been made with excellent reports received. Using the receiver for receiving f.s.k. will be covered in a future article. See you on r.t.t.y. f.s.k. soon. ●

REFERENCE

1. "FSK for the Transceiver," W9TKR, "CQ," Dec. [redacted]

BOOK REVIEW

73 DIPOLE AND LONG WIRE ANTENNAS

73 VERTICAL, BEAM AND TRIANGLE ANTENNAS

Edward M. Noll, W3FQJ

Two of a series of books designed to encourage Amateurs to construct some of their equipment. Each book presents seventy-three variations of the types listed in the titles using a minimum of theory and calculation. Commonly available materials and simple hand tools are used for construction. An appendix describes simple measuring methods and inexpensive instruments essential to ensure maximum performance. Types to suit every Amateur from flat dwellers to graziers are [redacted]

Australian Price: $5.60 and $8.00 respectively. Available from McGill's Authorised Newsagency (see advertisement).

"RADIO DATA REFERENCE BOOK"

3rd Edition

Modern Radio and Electronics techniques requires the use of a large and increasing amount of reference data. One of the publications which has stood the test of time in filling the needs of Engineers, Technicians and Amateurs is the "Radio Data Reference Book," the third edition of which is now available. This particular edition is noteworthy for the inclusion of improved design information pertaining to Pi and LPi couplers to ensure proper matching of valves and semiconductors.

Publisher: Radio Society of Great Britain. Compiled by G. R. Jessop, C.Eng., M.I.E.R.E., G6JP. Available from Magpubs, Box 67, East Melbourne, Vic., 3002, or from technical book sellers.

Commercial Kinks

With Ron Fisher,* VK3OM

Help. If you are one of the many who tried a 100K ohm resistor in the cathode of your FT200 product detector and found that it would not work, try a 10K resistor This will have the desired effect.

THE FT200, Part 2

I wonder if any reader has successfully modified an early model FT200 for use with an external v.f.o., in particular the Yaesu FV200? It appears on the surface to be a fairly complicated job. If you would like to give it a try, I can supply all the circuit modifications that would be needed. Any takers?

I am also after a volunteer to design an effective noise blanker, but here I regret that I cannot supply any details.

Now back to our service notes as supplied by Mr. Fred Bail, of Bail Electronic Services, the Australian Agents for Yaesu.

Symptom: R28 plate dropping resistor burns out. Probable cause: Intermittent internal short in V3. Cure: Replace V3.

Symptom: Vox relay intermittent and erratic in operation. Probable cause: Diode D2 and/or valve V8. Cure: Replace D2 which is a type SH1 silicon diode. Check both valves V8 and V9. The voltage across the vox relay should be approximately 60 volts. Trouble in the vox section will show up in both the vox and p.t.t. positions as most of the circuitry is common to both. If you tend to use vox either on s.s.b. or c.w., trouble may initially show up as a shortening of the vox delay time to the point where you cannot adjust for enough delay on the delay control. Any low voltage silicon diode is suitable in this section. An EM401 100 p.i.v. diode is typical.

Symptom: V.f.o. jumping in frequency after warm up. Probable cause: Component and lead-in wire eyelets on v.f.o. printed circuit board not soldered to copper laminate. Cure: Remove board and re-solder all eyelets and components.

Symptom: V.f.o. jumping in frequency during tuning. Probable cause: Bad contact between tuning condenser wiper forks and shaft. Cure· First try cleaning with pressure-pack contact cleaner. If there is no improvement, remove the forks, re-tension and replace them in position.

Symptom: V.f.o. jumping in frequency during mechanical shock. Probable cause. Dry joint or loose mounting screws on v.f.o printed circuit board. Cure. Solder joints on the board and tighten screws where necessary.

Symptom. Pulling or f.m. of v.f.o. frequency on voice peaks, also may show up as frequency shift on c.w. Probable cause: Defect in voltage regulator causing slight variation in regulated voltage to the v.f.o. Cure: Locate the voltage regulator which is on a printed circuit board under the chassis to the rear of the v.f.o. box. Check the regulator components and also the input and output voltages. The output should be 9 volts and this can be adjusted by means of VR501. If the fault exists only when operating on 12 volts d.c. power supply, check that the battery voltage is normal at the d.c. 200 input terminals.

Symptom: Calibrator signal weak or intermittent. Probable cause: Faulty connections or dry joints on the calibrator printed circuit board. Faulty diode D103. Cure: Check voltages on the board. Re-solder eyelet rivets to supply voltage tags. If D103 is faulty, this can cause low or no output on the higher bands. Replace with a small germanium diode, a 1N60 is typical.

Symptom: Receiver loses sensitivity. Probable cause: Break in continuity of antenna to r.f. coil L12. Cure: Check continuity, especially at junction of co-ax cable and receiver r.f. coil L12. Also check the antenna change-over relay and clean the contacts if necessary.

There is still quite a bit to go with the trouble shooting, but I think I might hold them over until next month and perhaps use the space left to cover a few simple modifications.

C.w. operators will have noticed that there is no control over the carrier power when switched to the c.w. position. As it is possible to vary the carrier level in the a.m. position with the a.m. carrier control at the rear of the chassis, all that is necessary is to wire this control to the c.w. position on switch S3e. Cut the connection to position four and then bridge to position five. Now you can adjust the c.w. level to give 150 watts d.c. input.

Key clicks seem to be a problem with the FT200. If you are having trouble try this one. Remove the 470K resistor from pin 1 of the 7360 balanced modulator tube. Replace this resistor with two 220K resistors in series. Connect a 0.01 μF. paper condenser from the junction of these two resistors to earth.

The ZL FT200 Club. If you own an FT200 could I suggest that you consider joining this live-wire club. Their object is to keep members informed of current improvements and modifications to the FT200. They do this by means of a well presented monthly newsletter. The annual subscription is only 75c. Further information can be obtained from the Secretary, D. J. Parkinson, ZL1BJP, 36 Western Road, Tauranga, New Zealand.

I will be back next month with more on the FT200 plus more on the Trio 9R 59D and a 160 metre modification for the R1155 receiver. In the meantime the Editor is still pondering on how many sharp eyes managed to miss "Sympton".

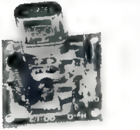
* 3 Fairview Avenue, Glen Waverley, Vic., 3150.

Bill Sebbens. VK4XZ, at the Townsville Civil Defence casualty state board. Bill, along with several other Townsville Amateur Radio Club members, is active with the Civil Defence organisation. Main communication links were manned by Amateurs immediately after Cyclone "Althea" wrecked Townsville.

Hy-Q Electronics

CRYSTAL OSCILLATORS AND FREQUENCY MARKER KITS

for the Amateur and Professional



OSCILLATOR KITS

QO-1: 3 MHz. to 20 MHz.
QO-2: 20 MHz. to 60 MHz.

Input: 4V. to 9V. DC, 20 mA.
Output: 200 mV. on 50 ohms.

KIT LESS CRYSTAL: $6.60
Including Sales Tax and Postage

20 ppm CRYSTALS if ordered with Kit:
Fundamental (QO-1) $4.50
3rd O/T (QO-2) $5.50
Including Sales Tax and Postage

FREQUENCY MARKER KIT QO-3

Output: 1 MHz., 500 kHz., 100 kHz., 25 kHz. } 1V. P/P.

Input: 9V. DC, 25 mA.
Stability: Typically within 3 ppm.
Accuracy: Adjustable against WWV to within 1 ppm.

KIT INCL. CRYSTAL: $17.60
Incl. Sales Tax and Postage

ASSEMBLED UNIT: $19.60
Incl. Sales Tax and Postage

Hy-Q Electronics Pty. Ltd.

1-10-12 ROSELLA STREET (P.O. BOX 256), FRANKSTON, VICTORIA, 3199.
Telephone 783-9611 Area Code 03. Cables: Hyque Melbourne. Telex 31630.

N.S.W.: Hy-Q Electronics, 284 Victoria Avenue, Chatswood. Phone 419-2397.
QLD.: Dresser Aust. Pty. Ltd., Brisbane. Phone 79-1182.
W.A.: R.F. Systems, Perth. Phone 46-7173.
S.A.: General Equipments, Adelaide. Phone 63-4844.
TAS.: Video and Sound Service Co., Hobart. Phone 34-1180.
N.T.: Combined Electronics. Phone Darwin 8581.

KITS

★ VK3 2 & 6 MX PRE-AMPS.

as in Dec. '70 "A.R."
$4.86 complete

★ VK3 2 METRE CONVERTER

as in Feb. '69 "A.R."
$10.58 complete

★ VK3 432 MHz. CONVERTER

DOUBLE CONVERSION:
$18.30 complete
SINGLE CONVERSION:
$14.52 complete

★ VK3 6 METRE CONVERTER

as in Dec. '71 "A.R."
$15.50 complete

★ CARPHONE BOARDS

TRANSMITTER **$5.00**
RECEIVER **$5.00**
Components list supplied.

Available to W.I.A. members only

BUILT BY AMATEURS FOR AMATEURS

Write for the list of keenly priced components, post free

Send Money Order/Cheque to:

W.I.A. VICTORIAN DIVISION COMPONENTS COMMITTEE
P.O. Box 65, Mt. Waverley, Vic., 3149

Send 20c (Vic.), 30c (other States) for postage

NEWCOMER'S NOTEBOOK

With Rodney Champness,* VK3UG

OVERHAULING AND CONVERTING OLD DOMESTIC RECEIVERS FOR AMATEUR USE

By necessity my suggestions on this subject must be generalised as the various sets available differ considerably. The types of sets to be discussed are the b.c. or preferably the d.w. or triple wave mantel or table sets produced post war. A suitable set will have at least five valves with converter, i.f. amp., detector/1st audio, audio output, and power rectifier. It will be even better if the set has an r.f. stage or two stages of i.f. amplification. Old 32 volt sets will make ideal sets for conversion—having been designed for weak signal strength areas.

The vibrator power supply of the 32 volt set will need to be replaced by an a.c. power supply giving similar h.t. voltages, which can vary from as low as 32 volts to about 200 volts, at currents up to about 40 or 50 mA. It would be wise to make the supply capable of handling in excess of this so that converters and other ancillary equipment can be powered without power supply stress. The heater lines will need to be re-wired to suit either 6 or 12 volts. Some of these sets use 25 or 35 volt valves, so re-wiring of these is impractical. The h.t. lines of these sets can be fed with up to about 50 volts and the audio section with upwards of 100 volts. Care is necessary here as the power valves in vibratorless sets use little bias, so alterations to the bias network to increase bias and keep the current drain of the output valves to a reasonable level is necessary.

When overhauling any of these sets, either 32 volt d.c. or 240v. a.c., it will be necessary to replace all paper capacitors as most will be leaky. In non-critical positions such as cathode bypasses and h.t. bypasses, slightly leaky capacitors are satisfactory. Use polyester capacitors of similar values and voltages to those replaced. In the a.g.c. line lower voltage rating capacitors such as the 100v.w. Greencaps could be used. It might be noted that the a.g.c. voltage can be as high as —40 volts in some sets, and as low as —4 to —5 volts in some other sets. This depends mainly on the a.g.c. characteristics of the particular valves in use.

I have made it a habit to collect old valve radios which have been "pensioned-off". These may be available from relatives, friends or hopefully cheaply in "as traded" condition from radio retailers.

Before working over a set it will pay to sit down and work out just what sort of job can be reasonably expected of such a set. It must be borne in mind that these sets were designed and built before s.s.b became all the rage, which means that physical stability of the tuning system does leave something to be desired. The tuning system will no doubt have backlash, and fairly direct tuning. Many tuning gangs are mounted on rubber grommets. This is to prevent acoustic feedback on short wave. If the speaker is to be mounted externally these grommets can be removed, giving an improvement in the tuning.

What kinds of jobs can be expected of a converted set? With suitably rewound or doctored r.f., aerial and oscillator coils it should be possible to obtain quite satisfactory performance on the 160, 80, 40 metre bands even for s.s.b. For use on higher bands converters ahead of the receiver would be desirable for best results. If s.s.b. or c.w. is not contemplated, a tuneable i.f. of 14 to 18 MHz. would be suitable for 6 and 2 metre converters. Once again I must emphasise that the ideas expressed in these articles will not help you immediately to get a station capable of working Moonbounce.

Should your set have only the b.c. band, you would have to decide what band(s) you want to rewind the coils for, or maybe you are going to use the b.c. band as a tuneable i.f. with converters ahead. This latter system I do not recommend as breakthrough from strong broadcast stations is more than likely unless you are prepared to shield the whole receiver very extensively.

As straight out receivers on Amateur bands, 3.0 to 8.0 MHz. would suit 80 and 40 metres. These are rather wide tuning ranges which would suit the general S.w.l. more than the newly licensed impoverished h.f. Amateur who will likely want bandspread on the Amateur bands only. Bandspreading usually makes all the mechanical tuning instabilities—mostly backlash—not so apparent. S.s.b. and c.w. will be easier to tune. An easy method of bandspreading can be achieved by putting a one or two plate small variable capacitor across the existing oscillator tuning capacitor. This simple modification will make fine tuning of s.s.b. so much easier. Modifications to the existing tuning system are unlikely to achieve as much success.

Some sets have upwards of four or five controls on the front panel. The only controls which are necessary are: on-off/volume, tuning and bandchange (if fitted). This means that up to two spare positions are available for controls on new facilities, such as a mode switch to switch between a.m., s.s.b./c.w. and f.m., or to switch converters in and out. An r.f. gain control and an a.g.c. time constant control could be fitted to mention just a few. These things can be fitted without altering the outward appearance of the set. Some of the potentiometers could be of the dual concentric type, but make sure you can get knobs to suit. If you are going to discard the cabinet, the fitting of some form of rigid adaptor plate to the front edge of the chassis would be desirable. The speaker could be removed and fitted into a separate box. This will give more room in the set for modifications.

Depending on what modifications have been done in regard to the bands to be tuned will depend what modifications will be necessary to the tuning dial. If none of the scales are to be used, the print can be washed off on most of the glass dials. The plastic dials may succumb to the same or with a razor blade. If this is not successful a dial could be made out of thin perspex sheet cut to size. The actual markings on the dial can be done with Letraset or similar lettering transfers. A method I have used extensively is to paint the markings on with red or black paint using an old steel nibbed pen. This is not quite as neat but it is cheap and effective.

The coil data is not given as the coil formers that you have on hand will be of various diameters and the exact bands for which you wind them will vary. Data for winding coils and the formulae for determining tuning range will be found in the R.S.G.B. and A.R.R.L. Handbooks. It will not be too hard to work out what values of series and parallel capacity will be necessary to give bandspreading of particular bands you may wish to tune.

The above information is, as I have already stated, very generalised. I have talked of tuning a.m., c.w., s.s.b. and f.m. These modes will mean the fitting of a product detector, possibly audio derived a.g.c., carrier insertion oscillator, S meter, etc. Would you care to drop me a note on what requirements you could reasonably need, for use in compiling a future issue? ●

* 24 O'Dowds Road, Warragul, Vic., 3820.

"20 YEARS AGO"

With Ron Fisher, VK3OM

Back in September 1952 Federal Executive must have been a mystery to quite a few of our members; the Editorial of that month stated: "With a view to creating and stimulating interest in our organisation, Federal Executive believes that, in addition to weekly broadcasts and the news distributed at meetings, members should have available to them some record of what is being done by Federal Executive on their behalf." So a new feature appeared, "Federal Executive Proceedings". Little of interest was reported in the first edition but we will keep an eye on later issues and trace the history of "F.E."

VK5 was well represented with technical articles. E. A. Charles, VK5YQ, presented an "Economical Design for a Simple Standby". Using two tubes in the r.f. section full coverage from 80 to 2 metres was achieved by using crystal control on 80 to 6 and then turning the final into a modulated oscillator on 2 mx. The line up was a 6AG7 or 6SH7 oscillator driving a QQC04/15 p.a.

C. H. Castle, VK5KL, discussed "Radio Control of Model Aircraft". Strangely a subject we see very little about in Amateur publications, however as VK5KL stated, "Much credit can be given to our fellow Australian, the late Ross Hull, who, whilst on the staff of 'QST' over a period of years made a close study of radio controlled models and his development of a simple actuator and escapement is still used today in simple types of control and is most reliable."

The "Effects of Electricity on the Human Body" are fully covered in an article presented by courtesy of the Victorian State Electricity Commission.

Both the DX and VHF notes reported a very quiet month, a few Europeans however were reported worked on the new 15 metre band. It seems that VK2AWU might have made the first VK/Europe contact on this band. Any contenders?

The Hamads for September 1952 made good reading and included in the for sale section, 75 feet of 300 ohm feeder, an AR7 receiver and a 3BZ transmitter. Type A Mark III. transceivers head the wanted to buy column with someone wanting a copy of a BC348 instruction manual. I wonder if he got it. Of course, Commercial Kinks was not a part of "A.R." in those days, today he would have no trouble at all.

TECHNICAL REVIEW

By "A.R." Technical Assistants

THE YAESU FT75 TRANSCEIVER

● The Yaesu Company of Tokyo, Japan, has established itself over the last few years as one of the world leaders in the manufacture of Amateur equipment. Many items of Amateur gear designed and produced by Yaesu will go down in Amateur history. Their progressive approach to Amateur design is exemplified in the new FT75 transceiver. As the illustration shows, this little rig sets a new approach to the format of compact s.s.b. transceivers.

DESIGN FEATURES

The most obvious difference between the FT75 and more familiar transceivers is the size. It measures 210 mm. wide, 80 mm. high and 300 mm. deep. Converting to more familiar units, this works out at 8¼ by 3 by 12 inches. The total weight of the transceiver not including power supply is 3.8 kg., which is just under 8½ lbs. The transceiver is supplied with a push-to-talk 10K ohm dynamic microphone of excellent quality. Also supplied with the d.c. power supply is a mobile mounting cradle. On either side of the transceiver are slotted aluminium rails which are designed to slide into the mobile cradle to mount the transceiver firmly in position. Provision is made to clip the mobile power supply under the cradle.

An a.c. power supply with built-in speaker is available and is contained in a cabinet of identical type and size to the transceiver. The d.c. supply, which also has a built-in speaker, is somewhat smaller, at 8¼" wide, 2½" high and 6¾" deep. The weight including cables is 1.46 kg. or 3½ lbs. Both the transceiver and the a.c. power supply are finished in a speckled grey enamel. The transceiver front panel is finished in a smooth dark grey enamel with white lettering; the knobs are black with chrome inserts. Above each of the push-button controls is a miniature red indicator light. So much for the external finish. Let us look inside and see what makes it work.

TECHNICAL FEATURES

The FT75 differs from the normal transceiver in that it does not contain a v.f.o. Instead, a v.x.o. is provided. Readers may remember the older Yaesu FT50 transceiver and the FL50 transmitter, both of which also embodied this feature. The v.x.o. of the FT75 has been improved over the earlier models, and has provision for a total of fifteen crystals with push-button selection of three for each of the five bands covered. There is also a push-button to select an external v.f.o. to provide complete coverage of each band from 80 to 10 metres. The v.x.o. control allows a frequency variation of 3 kHz. on 80 metres, 6 kHz. on 40 metres, 3 kHz. on 20 metres, 20 kHz. on 15 metres, and 12 kHz. on 10 metres.

The unit is fully transistorised except for the transmitter driver and final stages. In all, it contains a total of 16 transistors, 6 FETs, 3 ICs, 23 diodes and, of course, the two valves. All the features normally expected in modern transceivers are incorporated. These include a noise blanker, and effective fast attack a.g.c. and squelch on reception. On the transmit side, provision is made for c.w. operation with a separate carrier generator. With s.s.b. operation an effective a.l.c. system is used to reduce the possibility of flat-topping. The transmitter is designed to run a power input of 50 watts on both c.w. and sideband. Other features include low level r.f. output for driving a transverter, switching for a linear amplifier and switching for remote band change of either a mobile or home station antenna.

All connectors used on the transceiver are top grade commercial quality which are well suited to rugged mobile and portable use. The microphone uses a five-pin screw-on type plug, while the main power connector is a sixteen-pin lock-on type. Antenna connection is via a standard Amphenol SO239 socket for which a matching PL259 plug is supplied. The controls of the FT75 are designed for the utmost simplicity of operation. Transmitter tuning is peaked with a preset adjustment for each band on the rear apron of the transceiver. The effectiveness of these adjustments will be discussed in a later section of this article. Transmit/receive operation is push-to-talk there is no provision for v.o.x.

CIRCUIT DESCRIPTION

The heart of any sideband transceiver is the filter. In the FT75 it is centred on a frequency of 5173 kHz. and has the following characteristics. Bandwidth at 6 dB. is 2.3 kHz., at 60 dB., 4.5 kHz. This gives a 6/60 dB. shape factor of 1.95, which is excellent by any standard. As the transmitter and receiver sections use very little common circuitry, we will look at them independently. Where there is a common path, some most interesting kinks are employed.

Careful design has been used in the receiver front-end and as we shall later see, this has really paid off. The r.f. stage uses a dual gate FET. Separate high Q coils for each band provide input coupling. Between the primary of each of these and the antenna input is one section of a two-gang r.f. gain potentiometer. This provides a degree of r.f. attenuation along with the more normal r.f. gain. An i.f. rejection trap is connected to the input gate of the r.f. stage and a.g.c. voltage is applied to the second gate. The output from the FET mixer goes to the first two receiver i.f. stages with the noise blanker connected around the second of these. The blanker uses quite simple circuitry with two diodes to generate the pulses and two transistors to amplify them. The filter comes next in line and it is interesting to note that the received signal goes through in the opposite direction to the transmit signal. Extensive use is made of diode switching to isolate the various functions. After two more stages of i.f., the second of which is an integrated circuit, the signal is fed to the transmitter balanced modulator, which is used as a product detector. Carrier re-insertion is provided by the transmitter carrier oscillator and the resultant audio output is fed to the audio amplifier—another integrated circuit—via a set of relay contacts so that the balanced modulator can be switched back to the transmit function.

The transmitter line-up is straight forward, but in order to facilitate tune up and c.w. operation a second carrier generator has been provided. This is on a frequency of 5173.2 kHz. which puts it right into the bandpass of the filter. This also gives an 800 Hz. offset for c.w. reception because the normal s.s.b. carrier oscillator is still used for reception. Two transmit i.f. stages are used to drive the transmit mixer, followed by the 12BY7A driver and the 12DQ6B final. The final matches into a fixed 52 ohm load. The circuit is quite normal except that a separate final tuning condenser is provided for each band. These are of the screwdriver adjust type. Metering for the final is provided on the edge type front panel meter in two ways. Either final cathode current or relative r.f. output. The functions are selected by a slider switch on the rear apron, the meter reverting to S units in the receive mode.

The frequency of the v.x.o. crystals are selected by taking either the sum or difference of the i.f. and output frequencies. For the various bands they work out as follows: 80 mx, 8672.4 kHz. to 8872.4 kHz.; 40 mx, 12172.4 kHz. to 12322.4 kHz., 20 mx, 8827.4 kHz. to 9176.4 kHz., 15 mx, 15827.6 kHz. to 16274.6 kHz.; 10 mx, 11413.8 kHz. to 12262.3 kHz. The crystal frequency is doubled on ten metres and because of the offset on c.w. a crystal chosen for this mode should be 1.2 kHz. higher. Four crystals are supplied with the FT75 as standard, and these are on output frequencies of 3536, 7085, 21400 and 28550 kHz. Other channels can, of course, be ordered from the distributor.

POWER SUPPLIES

The a.c. and d.c. supplies are designated FP75 and DC75 respectively. Both are arranged to deliver the following voltages: 300 or 400 volts high tension for the 12DQ6B final amplifier, 150 volts for the final screen and the 12BY7 driver plate and screen supply, 100 volts of bias for the transmitter valves and 13.5 volts d.c. for the transistorised section. The FP75 utilises one transformer of quite small dimensions. It is about the size of a normal 100 mA. transformer. Four secondary windings deliver the required output as follows. The 300/400 volts and the 150 volts derive from a bridge rectifier across a 115/140v a side winding, the 150 volts from the centre tap in the usual way. A bridge rectifier across an 11 volt winding delivers 13.5 volts and a single diode in a half-wave circuit across a 100 volt winding provides the 100 volt bias. 12.6 volts a.c. for the transmitter filaments complete the supply. Apart from the transformer, all the components are mounted on a small printed circuit board. During the tests we carried out, the supply ran very cool even after many hours of operation.

The DC75 uses two type 2SD87E transistors to deliver the high voltage requirements. Only two secondary windings are required, one for the 100 volt bias and one for the 300/400/150 volt output. Both the transmitter filaments and the transistorised portion of the rig are supplied direct from the battery. The DC75 operates from a nominal 13.5 volt negative earth battery supply. An internal relay switches the high voltage supply on during transmit periods.

The power consumption of the FT75 with its associated power supplies for d.c. is 6.5 amps full output transmit, 3.5 amps standby and 1.4 amps receive with transmitter filaments off. On a.c., the power drain is 80 watts transmit and 50 watts standby.

THE FT75 ON AIR

For the on-air tests we were provided with the optional external v.f.o., the FV50C. It was thus possible to test the transceiver across the entire width of each band. The receiver proved to be a surprisingly good performer. Having had rather disappointing results from transistorised receivers in the past, the first test was to check for front-end overload and cross modulation. The 80 mx band was chosen on a night when a couple of the local Amateurs were operating. With the r.f. gain full on no trace of either cross modulation or overload could be detected. The a.g.c. action proved

most pleasant in action. A very fast attack time eliminated all tendency to hardness, while the decay time was long enough to reduce pumping effects to a negligible amount. With a signal running an estimated 20 dB. over S9, the decay time was about four seconds. S meter readings on the FT75 under test appeared to be somewhat optimistic, but as an S meter sensitivity preset control is provided, owners will be able to adjust it to suit their personal taste.

It was noted that if one of the v.x.o. channels was switched in with the external v.f.o. connected, signals could still be heard on the v.f.o. frequency, indicating some stray coupling across the switch contacts. Under the same conditions a spurious signal was present in the transmit mode. It is therefore necessary to make sure the v.f.o. is disconnected when v.x.o. operation is used. The noise blanker proved to be only moderately effective. Noise of the sharp pulse type such as car ignition was reduced by about 15 to 20 dB. in level. The action of the blanker reduced the overall signal level by 3 dB., but did not introduce any noticeable distortion on the received signal.

The squelch control worked very well. As the control was advanced the threshold level was gradually increased up to a level where only an S9 plus signal would open it up. The slow decay on the a.g.c. meant that it could take two or three seconds for the squelch to operate. This seems to be a feature to which the operator would have to become accustomed to over a period of time.

Transmitter output (p.e.p.) was measured with the following results: 80 mx 30w., 40 mx 29w., 20 mx 28w., 15 mx 27w., and on 10 mx 33 watts.

At the same time tests were made to determine the bandwidth of the final amplifier. The 80 mx band was chosen because any specific frequency change here represents a greater percentage variation. The results were surprising. The output dropped off by 1.5 dB. when the frequency was changed by plus or minus 10 kHz. After this there was no detectable difference in output from one end of the band to the other. For this test the output was initially peaked on the v.x.o. frequency of 3585 kHz. The higher bands proved to be just as good with an even smaller drop in output off the resonant adjustment.

FV50C V.F.O.

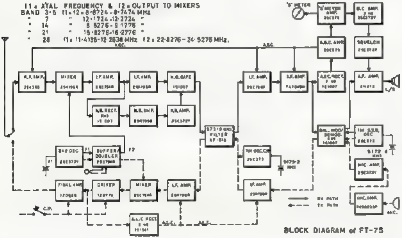
Looking back to the review of the Yaesu FL50 transmitter in the October 1968 issue of "Amateur Radio," mention was made of the FV50 v.f.o. but no data was published on the performance. Firstly a description of the unit. A separate tuned circuit is provided for each of the five bands, the output frequency being over the same range as the v.x.o. crystals except in the case of the ten metre band where the v.f.o. operates on twice the crystal frequency, that is from 22827.6 kHz. to 24524.6 kHz. The dial calibration is arranged so that there is an identical tuning rate on all bands from 80 to 15 metres. The ten metre band tunes at twice this rate, that is two kHz. for one on the lower bands.

Considering that the v.f.o. is switched and that frequencies of 8.6, 8.8, 12.1, 15.8 and 22.8 are involved, the stability is very good. Tests were made from a cold start on each band with the room temperature at 20 degrees C. On 80 mx there was a 1.25 kHz. drift over the first five minutes, and a further 0.5 kHz. over the next half hour. On 40 mx the drift was 4.5 kHz. over the first five minutes with 2.5 kHz. over the next 50 minutes back towards the starting frequency. On 20, 15 and 10 mx the drift averaged 1.25 kHz. over the first five minutes with a further 1 kHz. over the next half an hour. In view of the 40 metre performance, this unit was returned to the distributor and a second unit obtained. This one showed an improvement with a total drift of just over 1.5 kHz., most of which occurred over the first five minutes.

Dial linearity was fair. With the reading corrected at the low end of the band, an error of 4.5 kHz. and 6.5 kHz. occurred at the 100 and 200 kHz. calibration points on the 80 and 20 metre bands. 15 metres was somewhat better with an error of 1, 1, 3 and 6 kHz. at successive 100 kHz. points. 40 metres proved the best with less than 0.5 kHz. variation between each 100 kHz. point. The dial linearity was not checked on ten. Bump testing the cabinet of the v.f.o. produced no variation of beat note on 80, 40 and 20 metres, but there was some warble on 15 and 10 metres.

CONCLUSIONS

The FT75 transceiver is an excellent little rig. It will no doubt see most use as a compact, easy to operate mobile setup. However, it should not be overlooked as a home station for use where space is limited. The FT75 used in our tests was kindly supplied by Bail Electronic Services of 60 Shannon Street, Box Hill North, Vic., 3129, to whom all enquiries should be directed.



BLOCK DIAGRAM of FT-75

OBITUARY

GORDON COLE, VK2DI

New South Wales lost one of its prominent DX'ers when Gordon Cole, VK2DI, passed away on 13th July, 1972, due to a heart attack.

Gordon obtained his Amateur licence in November 1935 and broadcast operator's licence the following year. He joined one of the Sydney stations, working there on the technical side for a number of years.

For the past 17 years he combined his technical knowledge with commercial activity in the audio engineering field, which took him abroad on a number of occasions.

His Amateur station was at all times kept in first class order and being a perfectionist, it was difficult to distinguish between his home-brew and commercial equipment. His prowess as a DX'er is displayed in the following certificates: W.A.Z. No. 42, D.X.C.C. No. 168 with approx. 335 countries worked, D.U.F. No. 38, and Empire D.X.C.C. obtained in 1949.

Gordon served as Honorary Treasurer of the N.S.W. Division of the W.I.A. for two years—1945 and 1946.

We extend to his XYL Jean and family our sincere sympathy.

Two Big Wheels in Phase

or Muscle Mobile

By N. WESTE,* VK5ZFE

Not deterred by the recent oil strike and hence the ban on sale of petrol in VK5, a small R. & D. team in Adelaide decided to extend the capabilities of the average mobile Amateur. This was easier said than done. However, being recent engineering graduates, the problem as will be seen, was solved conclusively, the solution not deserving the fate which befell it.

It was not until the transceiver was being mounted on the treadly (state of the art term for novel method of conveyance) that the wonders of this solid state age were really brought home. No half ton lead acid cell for this gem, instead, a super-light energy source—two No. 509 cells—terrific! The mind may well boggle at such simplicity.

Finding a suitable antenna posed an interesting problem, as there were a number of avenues open to approach. The thing was to find the most effective system. Initially, the thoughts were fairly standard—a ¼ wave whip or half wave dipole poking out the back. An unforeseen problem occurred here during the road tests. Inquisitive motorists (there still were some) insisted on edging right up until they had the required effect of bending the elements. Thoughts on a Yagi version were shelved as a result of this.

A more fiendish idea had to be found. It came in a moment of inspiration. Why not commutate to the two wheels and stub match them to the transceiver? Unbelievable! Two big wheels in phase! The necessary adjustments were made and, with the aid of an r.f. bridge, 50 ohms non-reactive load resulted. Did the r.f. transistors like this? It was their first taste of 50 ohms. No more 5 to 1 s.w.r's, no more inductive indigestion or capacitive clots. This was heaven!

Being a mobile article, the results of field tests must be presented. It was at this point that the day turned black—to a certain extent anyway. Quite free of the mains and any source of a.c. ripple in the supply, reports of hum were received. The scourge of all power engineers—commutator action—had claimed its toll.

At this point most experimenters would have gone inside, put their feet up, degassed some 807s and discussed the pros and cons of methods used. Not this group—not on your Nelly—they started thinking. You may have heard of a think-tank, well, the word tank being barred, this was dubbed a think-tube.

Whatever its name, it had the required effect, when one participant eclipsed all other suggestions with one which should surely go down in the annals of engineering as an all time masterpiece.

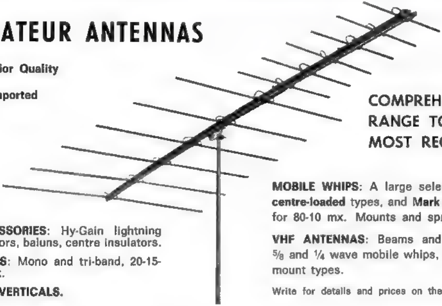
By sectioning the frame below the seat, and inserting an insulating block here, the whole frame could be fed as a vertical dipole. (At this stage we would forgive the reader if he paused in wonder at such a startling innovation.) Quick calculations with the ever-present slide rule showed that the handle-bars occurred at a node, and hence in no way affected the performance of the antenna.

With this device the group was ready to claim world wide Amateur markets. However, the crunch had to come, the success had been so marked. On the day of commissioning the news came that petrol was available. Within minutes the gathered crowd had scattered, leaving only the dedicated R. & D. crew with their contribution to a pollution free world.

Do not lose faith fellow Amateurs, all was not lost. The chief engineer, an avid Amateur, did not waste this chance. Sitting at 50 feet at his home QTH are three super-elliots in phase.

His colleagues laugh, but he knows . . . one day . . .

* 2 Fowlers Road, Glen Osmond, S.A., 5064.



THE MELLISH REEF SAGA—VK9JW

By DON MARSHALL,* VK4ZAF

● Four Australian operators have added a new chapter to the history of Amateur Radio. They are John Martin, VK3JW, of Balmadale, Vic.; George Down, VK4XY, of Everton Park, Brisbane; Keith Schleicher, VK4KS, of Aspley, Brisbane, and Roy Baxter, VK4EJ, of Camp Hill, Brisbane.

When John used the special call VK9JW to contact JA1KW on 20 metres s.s.b. at 0910z on July 13 last, Mellish Reef became yet another country to be worked by Amateur operators. The contact and another 11,000 in the following six days was a triumph for organisation and co-operation by the Amateur operator with limited resources. "The buzz of stations calling that night was music in our ears," party leader and prime mover of the expedition, John, said.

But why Mellish Reef?—a tiny 600 ft by 600 ft atoll in the Coral Sea some 560 miles north-east of Bundaberg and roughly 700 miles east of Cairns (see map)

John was a member of the group which last year reached Willis Island but failed to get to Mellish Reef. He felt he owed something to the Amateur world, so set about organising his own DX-pedition

The problems, not to mention the cost of such an operation, were formidable. But John had a sense of national pride which pushed him into making the effort.

Early this year, he and his friend Alf Matthews, VK3ZT, in Melbourne, started making plans. Six months of letter writing and calls followed for assistance of various kinds. Alf was to go along with John. Keith and Roy were invited to join in. Alf worked on official details in Melbourne while George, Keith and Roy sorted out the essentials in Brisbane. John was fortunate to receive a VK9 call sign with his VK3 letters. He also arranged for the services of launch skipper and owner Bob Poulson, a man very experienced in the treacherous Coral Sea waters and an expert navigator

Who was to know what was on a coral sandbank a long way from anywhere? What were the dangers? As far as possible, all had to be foreseen. John spent a week in Brisbane arranging food and cooking, water, shelter, bedding, aircraft and communications had to be planned, not to mention the stations, beams, power supplies and fuel.

One beam came from Laurie VK3BBX and another from VK4XK John VK4QA provided a pole and both Alf and Arthur VK4PX each lent a tent, poles and pegs, with S.w.l. Ray loaning a tent and furniture. At the last minute. Alf had to pull out for family reasons and George took his place.

All details hopefully solved, the party drove to Bundaberg and left at 2 a.m. on July 11. Mellish Reef is a speck in the ocean yet the navigator was only one-third of a mile out when the reef and the Herald's Beacon islet were seen about 11 a.m. on Thursday, July 13. The 40-mile radar picked up the islet at only five miles. Yet the waters were treacherous with coral bommies and pinnacles and it was not until 4.30 p.m. that the first dinghy load reached shore with the launch half a mile off The four worked by torch light to erect two tents beams and stations and fill and start the generator before that first call. George's 80 metre aerial stretched from high tide mark on the east to high tide mark on the west! It was midnight before 20 metres and the JAs and Ws dropped out. But what an achievement.

The weather, the governing factor of the DX-pedition, was good probably the best period of the year so far — and remained fair for most of the stay

Friday was a busy day The rest of the gear including hundreds of yards of power and co-axial cable was brought ashore by dinghy with the great help of the launch crew and the operation went into full swing.

John had his Swan 500 with an outboard v.f.o. feeding a TA33 junior beam, George his FTDX-100 feeding a folded dipole on 40, 80 and 15 metres, and Roy his FT101 with outboard v.f.o. also feeding a TA33 junior beam.

For power, there was a 2½ k.v.a. generator and a 1 k.v.a. generator as a spare. Seventy gallons of fuel was available for days and nights of hard working.

Terns occupied the southern half of the islet with nests among sparse vegetation and a stench that had to be smelled to be believed. And did they squawk! The tents were set up therefore at the bare northern end about 100 yards apart on the flat-topped coral bank only a few feet above sea level, spots probably awash during cyclones.

Then the calls from an eventual 103 countries started pouring in and some 3,000 contacts were made in the first two days! Unlike expeditions in the past, two or three transmitters were operating simultaneously Frequencies were re-set and were adhered to wherever possible to facilitate monitoring by Ws and VEs.

Trouble came on the second day, almost in darkness. The carburettor on the main generator fell off after a stud broke and VK9JW was off the air. Chaos! By torchlight they worked. The remaining stud was tightened and a hefty piece of copper wire inserted and twisted home. Then the power was on again and there were no more failures.

The average day started at 5 or 6 a.m. with contacts on 80 metres to Europe. Despite repeated requests, there were dogpiles all the time so that a total of only 400 to 500 Europeans was reached.

Breakfast was taken during a quiet time around 7 a.m. Roy then operated c.w. on 15 metres up to 4 p.m., though 20 metres was the band in the afternoon. Operators pulled out for lunch when they could or worked through.

Early afternoons were particularly good for South America and Mexico with 5 and 9 signals. Then came dinner

Keith worked many JAs on 15 metres between 7 p.m. and 11 p.m., during which time the American phone band was also open with many Canadian and American contributors contacting him. Europeans were coming through as late as 1 a.m. with 5 and 9 signals on the last day

Keith and John normally worked on the Swan s.s.b. with George and Roy on c.w. George was heard around 3660 kHz. at 8 p.m. each night reporting to VK4 on the day's progress. As one operator got tired, another took over Cooking (on a gas stove) and other chores by John and George, such as re-filling the generator regularly was not an easy job in the wind But the exciters were on for 90 per cent. of the time

Most contacts were made on 15 and 20 metres though there were some openings on 10 metres where about 500 to 600 contacts were made. Operating was of a very high standard and immediately stations got a report they would clear the frequency There was no time for the operators to chat with friends. But reports indicated that the Mellish Reef expedition was the most well-organised DX-pedition yet heard.

Of course, Mellish was not all Amateur Radio, but partly a holiday and the operators had their fun. The fishing had to be seen to be believed. Anything under 2½ or 3 ft. was thrown back and all stopped fishing when they realised the fish would only have to be left on the beach. A big coral trout caught on the first day provided so many meals they were almost sick of it! The water was so clear you could choose your variety. Keith caught a 5 ft. moray eel by dropping a line down its open mouth.

There were no health problems. Fresh water was limited so the operators were pretty dirty with a splash in the shallows the only safe bathing. Temperatures were decidedly tropical and operators merely wore shorts and took on mid-winter suntans.

A south-east wind gusting to 28 knots caused some chaos. Have you ever tried working Europe when one end of the beam is in the sand? Coarse coral sand provided little anchorage for the pegs used for the beams and tents. Some hefty gannets perching on the beam elements did not help either! A wrecked Spanish galleon, some wrecked Japanese trawlers and shell collecting were other diversions.

The DX-pedition was recorded on scores of slides and 250 ft. of movie film.

Too soon did the weather indicate it was time to leave Mellish. The honour of the last contact went to George who had done so much of the organisation and was with K8RTW at 1220z on the 19th. He called a KW6 about 1345z on Wednesday, July 19, to end almost a week of operation.

The party returned to Bundaberg safely on Sunday, July 23. When the logs were checked, all continents had been worked and a few rare African countries were among the list. The highlight had been the call from VK0CR. With not as much time as at Willis Island, twice as many calls were made. There had been no equipment failure and only 17 gallons of fuel for the generator remained.

For the operators, Mellish was the culmination of their Amateur Radio careers. In all, the DX-pedition was most successful and something Australian Amateurs can be proud of as a group.

Now John has the job of preparing the special QSL card. Be patient if you have to wait a while. Hundreds of QSLs are arriving for him daily

When John is through, he hopes to get working on another DX-pedition still on the secret list!

* 23 Karowara Street, The Gap, Brisbane, 4061.

From left John Martin, VK3JW; George Down, VK4XY, Keith Schleicher VK4KS, and Roy Baxter VK4FJ.

you and DX

With Don Grantley*

Times: GMT

Another trip to VK4 has further curtailed my already meagre activity, and for this month's news I have to rely entirely on Geoff Watts DX News Sheet, which as usual is a wealth of DX information. Before going on to the news, I would like to say that I am about to change QTH once again. This time I will be moving up to Gympie or thereabouts. This shift is due to transpire on or about the end of September. It will mean starting all over again for my award hunting activities as most of the ones I am interested in require all operation to be from the one call area.

Towards the end of June we saw the WB6CZB/WB6ZSZ doings in A35 and KS6, also 5W1. The entire operation covered almost two weeks, and all QSLs for the events go to WB5BHN.

XV5AC now active from Saigon using a KWM2 and being reported on 14090 and 14050 c.w. He is W4EVG and asks for all cards to be sent via his manager W1YRC. As a matter of interest, the Director-General of Posts and Telegraphs in Vietnam has notified I.T.U. that XV5AC may communicate with stations outside the Vietnam limits, thanks to the efforts of HS3DR and friends.

9M6AB was activated by Ed. KH6GLU from June 4 to 6, and QSLs for his 500 odd QSOs on those three days should go to K3RLY and not JA2KIT who normally handles the 9M6AB chores.

XU1AA has been quite active in the past weeks, but by the time you read this he should have gone QRT. However, John VE7IR/9M2IR/9M6AA goes to Phnom Penh every month and may operate XU1AA whilst there. He has a copy of that station's log from March 5 of this year and if you need a card subsequent to that date send a s.a.e. plus three IRCs to 9M2IR, Box 262, Johore Bahru, Malaysia. A further word is that John, together with two brothers, may go to XZ shortly.

The prefix S2 now used by East Pakistan has been heard of late with S2IR and VE7IR/S2 operating from Dacca up to June 19. Several Red Cross HB9 and LA operators have been in Bangladesh for the past three months and hope to be on the air soon, while Geoff Watts suggest we watch for OR4 stations from that locality.

Les PY2ERS and PY2MI have been very busy of late. They were on from St. Peter and Paul Rocks as PT0MI and 0WH, then were to go on to Fernando de Noronho as PQ0MI and WH, then they hoped to try Rocas on the return journey as PR0, having made an unsuccessful attempt to land there on the way out. QSLs for 0WH operations to Box 19073, Sao Paulo, and 0MI activity to Box 19094, Sao Paulo, Brazil.

A few odd prefixes to report this month. These include EI0DI from Dalkey Is. on July 28 to 30, QSL manager is EI7CC. FC2ABP from Corsica, QSLs to Jean-J Filipi, Box 44, L'Ile Rousse, Corsica, France. WI7UKE July 29 to Aug. 4 from the International Esperanto Conference at Portland Oregon. 7X7G is quite active, cards to the bureau, whilst 7X7Y goes to I0IJ. Both count as prefixes only. Robert OR4ES is with a scientific expedition to the Dasht-I-Lut Desert in Iran—manager is ON4VL.

A South America to Asia "first" was recently completed when EP2BQ worked PY1DVG on 160 metres on July 7 and July 8. EP2BQ now needs only Oceania for his 160 mx WAC and to this end is looking for VK6 contacts. His sunset is about 1530z and he usually listens on 1877 kHz. What about it George?

There has been some activity from Andorra over past months. C31CD, C31FE, C31FH were on from July 9 to 19, the operators were DJ8ES, DL2PU and DL28Z, the manager being DL6LJ, Box 211, D-4132 Kamp Lintfort. Another was C31FI whose QSLs go to F8ACU, whilst C31FN operated by a group from PA0, from July 5 to 20, ask for their cards to be sent via PA0PMP, P. M. Patings, Mgr v Schaikstr 5, Den Bosch.

There has been some confusion as regards the managership of FB8WW but F5QE now asserts that he will continue to handle the QSLs and that any cards received at F8BTH will be forwarded to him. FB8XX is still on the air most days from 0500z on the 15 metre band. He has been on 3768 at around 2200 on occasions. His manager is F2MO.

A few more strange calls for prefix hunters. JY4IA, Ibrahim, with 15 and 20 metre band contacts at 2000 or thereabouts. Address is Box 2353, Amman. LZ90D (that is LZ nine zero D) on 15 metres in the evenings local time, manager is LZ1KVV, Box 90, Sofia. WD4USA on from the National Democratic Convention, Miami Brach Florida during the week-end of July 10 to 13 asks for QSLs to be sent via Box 501, Miami Beach, Fla., 33166, U.S.A. Two more special stations from the States were WJ4ULY on Independence Day, July 4, QSL to W8TO or the bureau, whilst WR5OAR goes to WA5ZNY, and WS0EJ goes to Box 291, Omaha, Nebraska.

News to hand that Sam Rees, MP4TDM, is back in circulation once more in Ras-Al-Khaimah since June 6. He now has an improved signal since the introduction of a TH3-Jr beam and has a regular sked with GW3-AHN on 14265 s.s.b. Fridays at 1800z. His manager is K1DRN.

Rado SM0EEJ has been operating as YU-3GP/P from Dalmatin Is. quite regularly in the 15 metre band on about 21285, usually around 0800z or later. All QSLs should be sent to his home QTH.

That's about all I have in hand this month. My thanks to I.S.W.L. members and Geoff Watts for details.

* P.O. Box 222, Penrith, N.S.W., 2750.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

Editor "A.R.," Dear Sir,

May I add to the remarks of VK1AU re inadequacy of the 5 w.p.m. Morse test which, if adopted, I would suggest should confine the licence to c.w. operation until such time as 15 w.p.m. was attained.

Regarding an extra class licence, this would be a good starting point for those intending to enter the final education for a commercial licence, a good reference to a prospective employer, and most importantly, the great number of Amateurs who desire a goal for their advancement in the Amateur Radio fraternity.

—Kel Phillips, VK4OD.

Editor "A.R.," Dear Sir,

It is with gratification that I read in Don Grantley's "You and DX" in the July issue of "Amateur Radio" his para on Intruders, and his method of dealing with them.

This coincides with my contention, and my letter in the January 1972 issue reference the formation of a "QRM Brigade". It is good to know that others have the same opinions and it is interesting to learn that some Amateurs are actually taking the matter further in so far as acting on the suggestion laid down.

There are a few dedicated members in Australia who are having great success in QRMing these Intruders and moving them off the bands; at the same time they are having fun in doing it and a lot of satisfaction too.

—Alf Chandler, VK3LC,
Intruder Watch Co-ordinator, W.I.A.

A correspondent in VK3 (name and address supplied) complains of the injustice being done to the image of Amateur Radio by a minority of operators on the local Ch. 1 Repeater. He lists some most undesirable examples as—

1. Swearing on the air.
2. "———" copper behind him.
3. Telling a schoolboy operator unsuccessful with CQs to "knock it off" and "one call every five minutes is enough".

Believing most of the breaches occur through thoughtlessness rather than deliberate self-destruction, he offers the following suggestions:

1. Do not use bad language on the air.
2. If you have nothing to say, keep quiet.
3. If you do have something to say, do not be long winded about it.
4. Don't discuss driving problems, thus making the obvious even more obvious.
5. Encourage school clubs, etc.
6. Only use Ch. 1 if you cannot use a simplex channel.

He ends by saying that Repeaters are a great asset to Amateur Radio, but let our operating ability match our technical knowledge.

Ionospheric Predictions

With Bruce Bathols, VK3ASE **SEPT. '72**

The predictions for Sept. from charts, Series P, supplied by the I.P.S.D. are listed below.

As from next month, it is hoped to supply greater detail in the predictions, as a new type of chart in numerical form, and produced by computer, has been devised by the Ionospheric Prediction Service.

The predictions for this month are much the same as for the last month. However, the M.U.F. is showing a gradual increase, with the result that a little more activity is possible in the 10 metre band.

It should be noted that these predictions are workable for at least 50 per cent. of the month—but not all days.

VK4 is Townsville, VK0 is Macquarie Island.

All times stated are now G.M.T.

28 MHz.—

VK1/2	to	W6		minus 2 2300 plus 2
VK3	,,	JA		minus 2 0100 plus 2
VK4	,,	KH6		2300-[illegible]
VK5	,,	JA		2300
VK6	,,	SU		0700

21 MHz.—

VK1/2	to	8P	S.P.	2000-0700
,,	,,	8P	L.P.	minus 1 2800 plus 3 1000
,,	,,	VE3	S.P.	[illegible]
,,	,,	VE3	L.P.	2300
,,	,,	W6		[illegible]
,,	,,	PY		minus 2 2400 plus 2
,,	,,	ZS		0600 plus 5
,,	,,	VU		0100-1100
VK3	,,	VK0		minus 1 0300 plus 3
,,	,,	JA		[illegible]
,,	,,	G	S.P.	[illegible]
,,	,,	G	L.P.	2100, 0800
,,	,,	UA		0800-1100
VK4	,,	KH6		2000-1300
VK5	,,	JA		[illegible]
VK6	,,	W1		2300 plus 2
,,	,,	ZS		[illegible]
,,	,,	SU		0300-1300

14 MHz.—

VK1/2	to	8P	S.P.	2000-0800, 1000-1400
,,	,,	8P	L.P	2000-0100
,,	,,	VE3	S.P.	1200-1700, 0400
,,	,,	VE3	L.P.	2100-0300
,,	,,	W6		0100-1200, 1800-1900
,,	,,	PY		2000-1300
,,	,,	VK8		2300-0900
,,	,,	ZS		0800-1400
,,	,,	VU		0800-0100
VK3	,,	VK8		2100-1000
,,	,,	VK0		2100-1000
,,	,,	JA		2100-1600
,,	,,	G	S.P.	0800-1900, 2100 plus 3
,,	,,	G	L.P.	2000-0200, 0700-1300
,,	,,	UA		0800-1800
VK4	,,	KH6		0400-1000, 2000
VK5	,,	JA		0600-1800, 2100-0100
VK6	,,	W1		1900-1900, 2100-2300
,,	,,	ZS		[illegible]
,,	,,	SU		1300-2000, 2300-0300

7 MHz.—

VK1/2	to	8P	S.P	0800-1100
,,	,,	8P	L.P.	2100
,,	,,	VE3	S.P	0700-1200
,,	,,	W6		0700-1300
,,	,,	PY		[illegible]
,,	,,	VK8		[illegible]
,,	,,	ZS		1600-2100
,,	,,	VU		1200-2100
VK3	,,	VK8		0800-2200
,,	,,	VK0		0700-2100
,,	,,	JA		[illegible]
,,	,,	G	S.P	1600-2100
,,	,,	G	L.P.	0700
,,	,,	UA		1300-2100
VK4	,,	KH6		0700-1700
VK5	,,	JA		0900-2100
VK6	,,	W1		0900-1200
,,	,,	ZS		1500-2400
,,	,,	SU		[illegible]

Smoothed monthly sunspot number predictions for Sept. 55, Oct. 53, Nov. 51, Dec. 49.
—Swiss Federal Observatory, Zurich.

VHF UHF
an expanding world

With Eric Jamieson,* VK5LP

Closing date for copy: 30th of month.
Times E.A.S.T.

AMATEUR BAND BEACONS

VK0	53.100	VK0MA, Mawson.
	53.200	VK0GR, Casey
VK1	144.475	VK1VF, Canberra.†
VK2	52.450	VK2WI, Dural.†
VK3	144.700	VK3VE, Vermont.
	144.925	VK3QZ, Traralgon.†
VK4	52.400	VK4WI/3, Townsville.
	144.380	VK4WI/R1, Toowoomba.
VK5	53.000	VK5VF, Mt. Lofty.
	144.800	VK5VF, Mt. Lofty.
VK6	52.006	VK6VF, Bickley.
	52.900	VK6TS, Carnarvon.
	52.950	VK6VE, Mt. Barker.
	144.500	VK6VE, Albany.
	145.000	VK6VF, Bickley.
VK7	144.900	VK7VF, Devonport.
VK8	53.200	VK8VF, Darwin.
ZL1	145.100	ZL1VHF, Auckland.
ZL2	145.200	ZL2VHF, Wellington.
	145.250	ZL2VHP, Palmerston North.
	431.850	ZL2VHP, Palmerston North.
ZL3	145.300	ZL3VHF, Christchurch.
ZL4	145.400	ZL4VHF, Dunedin.
JA	52.500	JA1IGY, Japan.
HL	50.100	HL9WI, South Korea.

† Denotes additions or alterations this month.

Included with the beacon list this month are the new beacons for VK1 and VK2. It appears almost certain these will be in operation by the time you read these notes so they are included. With their inauguration this now gives Australia wide beacon facilities. The VK1VF beacon is a solid state device running 15 watts to a BLY89 transistor and omni-directional antenna. The VK2 beacon operates with an m.c.w. ident. at 30-second intervals at 7 w.p.m. The call sign is not confirmed at this stage. The companion 2 metre beacon may be delayed for a while until a new tower is erected at Dural to accommodate the various antennae anticipated for repeaters, beacons, etc. The Eastern Zone of VK3 beacon is off the air for a period having an overhaul, but should be operational by Dec from Traralgon and running 10 watts with a new call sign VK3QZ, that of the custodian of the beacon. It is anticipated the new beacon will be running higher power and A1.

The former Mt. Barker 2 metre beacon VK6VE is now operational from a site about 100' a.s.l. three miles from Albany and should now be sited much better propagationally! Four element beams are pointing on Perth and Adelaide and are 35 feet high. Later it is hoped to change these to 10 element beams, at least to Adelaide anyway. The beacon is on the air during the winter months from 0730 to 0030, and probably with continuous operation during the summer months.

The VK3 V.h.f. and T.v. Group have published elaborate details of recommendations for Amateur beacons. It is not proposed at this stage to discuss the various pros and cons of their recommendations in these notes, most of you will have read about them by the time this is published. However, there is one matter in which I personally am particularly interested and with the backing of plenty of VK5s as well. This is the matter of frequency allocations.

I quote from their disseminated material: "A 100 kHz. segment of each desirable band should be set aside (by gentlemen's agreement) exclusively for Amateur (Beacon) Service. This segment should be in a regularly tuned portion of the band, i.e. 400-500 kHz. from the (low) band edge. This ensures that all with tuneable equipment can tune the beacon segment. Putting beacons in areas where nobody tunes is pointless. Each beacon can be assigned a frequency which will be exclusive although channel sharing is permissible in certain cases. Future expansion has been allowed for as adequate channels for allocation to existing and proposed beacons. It also allows for simple equipment for checking band openings. With the increasing use of tuneable equipment covering 500 kHz. segments only, this enables these operators to make use of the beacon service."

May I make the following comments. (1) Because modern transceivers tune in 500 kHz. segments is no justification for setting up beacons in the first 500 kHz. of either the 6 or 2 metre band. There is plenty of activity between 52.400 and 52.500 MHz. during the DX season and just enough operation there at other times to foul up a receiver when someone is trying to monitor a distant beacon. The same applies, in VK3 particularly, on 2 metres where stations are spread right up to 144.500 and beyond (check Ron VK3AKC's frequency!). The 500 kHz. equipment so mentioned does not tune only one such segment. Most transceivers cover the full 2 MHz. band for the sake of purchasing an extra crystal or two, and the only effort to check for beacons between 144.500 and 144.600 is the flick of a switch! They will then be on the low end of the tuning range of the next segment anyway, the area which is most tuned by the DX types, so if you are hunting around 144.000 to 144.100 for weak signals, flick the switch and you can hunt away amongst the beacons!

(2) The type of person most likely to make use of the beacons is hardly likely to confine himself to only 500 kHz. of any band, so another segment will not worry him, and there will be plenty of time to turn that switch if he is the DX type because it is not uncommon to monitor a weak signal for an hour or more waiting for modulation content to rise out of the noise!

(3) Yagi antennae are still quite efficient up to 144.600 even when cut for the low end of 2 metres, so there will not be much gain loss difference between 144.500 and 144.600.

(4) Mixing and overload problems for those living close to powerful beacons (and they can be very powerful in good locations with line-of-sight conditions) tend to be reduced with every increase in frequency away from the operating area—and this is a very valid point which a few people might consider very seriously, particularly if you have not lived in an area experiencing such problems; the areas which have not had beacons before are those with the least idea of just what can be involved in these matters.

(5) Those operators who must use only a 500 kHz. segment of a band other than 28 MHz. for tuneable i.f. purposes need not despair, the addition of an extra crystal which can be switched into the converter oscillator circuit will still allow the second 500 kHz. segment to be tuned. I have used this idea for years on 6 metres to allow me to tune either 52 to 54 MHz. or 51 to 53 MHz.—no problems!

That will be enough on the matter for now to start some rumblings, and I don't mind receiving your correspondence on the subject. If you have something satisfactory to say, you might get into print!

CONTESTS AND V.H.F.

Further to my comments re v.h.f. participation in contests (June "A.R."), Geoff VK3YER advises the VK3 V.h.f. Group have discussed the matter and agreed there should be two sections in the National Field Day in February, (1) h.f. and (2) v.h.f. They add that v.h.f. operators are only competing against each other and are more likely to be recognised in the form of a place in the results as a reward for their efforts. Their views are being forwarded to the Federal Contest Committee chairman, Peter VK4PJ. Would other Groups like to talk about it and pass on their views? Similar thoughts might well apply to the Remembrance Day Contest, particularly if v.h.f. entries had a separate scoring system, and the result added to the States total. Very interesting!

METEOR SHOWER ACTIVITY

Wally VK5ZWW reports quite a burst of activity during the Aquarids meteor showers from 26th to 31st July. Rod VK3ZQJ had daily contacts with Joe VK7ZJG between 0600 and 0630 and Wally then had a turn with Joe from 0630 to 0700. Wally advises that with his 8 element beam pointing mid-way between Sydney and Launceston he could often hear both sides of the contacts between Rod and Joe, and has some copy on tape. These 6 mx contacts to VK7ZJG were mostly very good, and extending after the shower had set. All this has resulted in Joe furiously taking up the construction of s.s.b. equipment.

Will this grind to a halt in September when Joe walks up the aisle to receive the fetters of marriage to Mary? Best wishes to you both, there will be those hoping Amateur Radio will not cease from now on. Wally also mentions working Ian VK7ZIF in Hobart, and his attempts to work David VK3ANP has resulted in David re-building his transverter!

NEWS FROM NEW ZEALAND

David ZL4PG advises there will be at least four Amateurs operating from ZL4 this coming DX season on 6 metres: Stan ZL4MB, Peter ZL4LV, Bernie ZL4IS and David ZL4PG. Operation will be outside t.v. hours, which means up to about 1130 EST. David and Bernie are considering a portable operation just after Christmas and will advise details later. This should all be good news from the rather rare ZL4 district and means more chances for VKs to secure another call area. David also mentions quite an upsurge in interest in 144 MHz. s.s.b. and advises a national calling frequency in New Zealand of 144.200 MHz.

ANTENNA TESTING

Much interest is centered on the VK3 V.h.f. Group antenna testing day on 27th August. Equipment will be available to test on 52, 144, 432 and 576 MHz., for gain measurement and possibly s.w.r. If someone could be persuaded to prepare a full-sized article for "Amateur Radio" outlining details of the best antennae in each class and section it would be of considerable value to VK Amateurs. Results of previous such antenna days have always made interesting reading and many are showing interest in Swan and Quad Yagis, which are receiving all the publicity at present.

That's the news for this month. We are slowly passing out of the winter v.h.f. doldrums for brighter things to come. Ending with the thought for the month: "A skilful politician is one who can stand up and rock the boat and make you believe he is the only one who can save you from the storm."

* Forreston, South Australia, 5233.

Magazine Index

With Syd Clark, VK3ASC

"73" Magazine—May, 1972

SSTV Monitor the Easy Way; A 40w. 6 mx FM/CW Mobile Transmitter; Quick Band-Change Mobile Antenna; A Hi-Fi IC for Amateur Modulators and Receiver Audio (Philips TAA300), How to get the stuff into the House; Anti-CW Autostart; IC TV Sync. Generator; Radio Astronomy and Amateur Radio (Part 1 of two).

"SHORT WAVE MAGAZINE"—May 1972

Self Protecting Stabilised Power Supply Unit (6-18v. at 1.5a.); Low Pass Filter for Audio, Practical Electronic Keyer.

"AUSTRALIAN E.E.B."

Readers are asked to note that Leo Gunther, VK7RG, is again publishing his excellent little magazine. Subscription is a modest $1.55 for six issues. Enquiries should be made to P.O. Box 177, Sandy Bay, Tas., 7005.

CONTESTS

With Peter Brown,* VK4PJ

I hope you enjoyed the Remembrance Day Contest and are looking forward to next August. Don't forget to let me have your comments even if it is just an okay. If your log is not on the way, get cracking!

Now that you have the set running warm give it another run and help fly the Australian flag in the VK/ZL Contest. We can do with some additional entries over last year. To my mind this is a pretty good all round contest and for those who have yet to get D.X.C.C., you get quite a few new countries.

It is a pity that the R.S.G.B. 21/28 MHz. Phone Contest is on the same date. This is a contest that I have enjoyed for some years, but conditions are not good from this QTH for 10 metres, although I have heard VK6s working Gs with ease, and on 15 metres it is hard to break through the Japanese operators who participate strongly. At least you can be sure that there will be some Gs on 15 metres, and possibly 10 metres.

Take a look at these dates—

Oct. 7 1000z to 8th 1000z—Phone, VK/ZL Contest.

Oct. 7 0700z to 8th 1900z—Phone, R.S.G.B. 21/28 MHz. Contest.

Oct. 14 1000z to 25th 1000z—C.w., VK/ZL Contest.

Oct. 21 to 22—C.w., R.S.G.B. 7 MHz. Contest.

Oct. 28 to 29—Phone, "CQ" W.W. DX Contest.

Nov. 25 to 26—C.w., "CQ" W.W. DX Contest.

Dec. 9 to Jan. 21, 1973—V.h.f., Ross Hull Memorial Contest.

Feb. 10 and 11, 1973—Phone/C.w., John Moyle Memorial National Field Day Contest.

October is a real contest month.

February seems to be a long way off—but it is later than you think. What stage have you reached in planning for the 1973 National Field Day? Your team, location, accommodation, food, and equipment? If you have the necessary there are no problems, but if you have to obtain all or part you had better start now—some alternative locations too. If you have never been on a field day and wish to go, it is your next move. At this time I am considering that fixed stations should be separate from mobiles, as a section. Do you agree?

Ross Hull V.h.f./U.h.f. Contest.—I am hoping that you have some suitable gear and will be putting in a log for the 1972/1973 contest.

By now the VK2 V.h.f. and T.v. Group's Contest will have finished. I did not have opportunity to comment last month. I hope all enjoyed themselves. I consider that local contests, provided that they do not detract from major contests, have quite a value. In my case I look forward to the VK4 Sunshine State Jack Files Memorial Contest as it is a good opportunity to meet so many friends I would not otherwise meet on the air, as most contests do not cater for contacts within call areas.

A contest just finished is the N.Z.A.R.T. 80 metre Memorial Contest. This is a two-evening (four hours each) contest and quite a few VKs join in and are made welcome. I will remind you next year.

As time permits I will write for details of other overseas contests. Let me know of those in which you have an interest. The European phone DX Contest is on the 9th and 10th Sept. No details. I have details of the OK Phone/C.w. DX Contest which takes place on the second Sunday in November, 0001z-2400z, and will be pleased to forward details to you if interested.

Again **Please don't forget** to enter the VK/ZL Contest. Key club members should boost the c.w. section this year.

Stop Press.—1971 "CQ" W.W. DX Phone Contest single operator all-band top scorer was 6D1AA with 3,541,714 points; fourth was VK6HD with 2,911,224 points. 6th on 28 MHz. was VK9XK and 2nd on 7 MHz. was VK6CT. In the WPX Honour Roll, no VK is listed in the top 30 on mixed (1162 is the top), none in the tops for s.s.b. (1075 heads the list), and only VK3AHQ in the top 20 on c.w. (950 is tops here). (August "CQ")

* Federal Contest Manager, Box 638, G.P.O., Brisbane, Qld., 4001.

KEY SECTION

With Deane Blackman,* VK3TX

I hope you had an enjoyable R.D.

I have been frustrated in a few QSOs recently with mobiles on 160 mx because they had not equipped their elegant h.b. gear with a b.f.o. This set me researching, and while I knew the Marine Service on 500 mx, where there is not much more bandwidth than we enjoy in our 160 mx band, use A2 (m.c.w., if you like), the I.T.U. regulations only forbid A2 above 4 MHz. Not everyone uses a transceiver on 80 mx, practically nobody does on 160 mx, not to mention those who listen to these bands using transistor broadcast receivers. And m.c.w. could solve my problem very nicely. The regulations presently permit m.c.w. on the Amateur bands above 52 MHz. So, if anyone has thoughts one way or the other of the idea of allowing m.c.w. on 160 and 80 mx, I would be interested to hear from you.

I have been asked several times on the air what you must do to join the Key Section. The full rules appeared in "A.R." for November 1971, complete with printing errors, but in brief you must have 50 c.w. QSOs lasting at least 15 minutes, all obtained since 1st Jan., 1971. The 50 stations must all be different and at least 25 of them must be VK. Send your application to me, or if you prefer, to your Divisional Key Section Co-ordinator, who will QSP. Now you know, you can get right on applying.

* P.O. Box 382, Clayton, Vic., 3168.

DIVISIONAL NOTES

SOUTH AUSTRALIA

All quiet on the headquarters front, the local Council must have appointed a sub-committee. Sub-committees are popular items, the Interference Committee has been reformed under the chairmanship of Peter VK5ZPS to provide technical expertise in methods of dealing with interference from Amateurs to consumers' equipment such as t.v., tape recorders, p.a. systems, etc., and also interference to Amateurs from other sources. This service is expected to supplement the Amateur's own knowledge when the going becomes difficult.

No one can be an expert on tx, rx, aerials, operating, v.h.f., slow scan, teletype, etc., and interference as well, so specialisation is obviously necessary. This committee should do well, it has a fair sprinkling of experts, both by accident and design.

The Broadcast Committee has also been formed to maintain the Sunday morning broadcasts. The load is now spread to enable operators and editors to share the somewhat difficult task of compiling an interesting broadcast of the required quality. The format pioneered by previous VK5WI operators such as Harry VK5MY and Colin VK5XY has been maintained by Jim VK5NB and the present compilers Adrian VK5AV and Kevin VK5ZKT.

The sharing of the load should enable a reasonably smooth transition to operating from our future headquarters, when a roster of operators will become necessary. The use of the repeater on 2 mx f.m. should enable a quality broadcast to be heard widely, and comments on its effectiveness will be appreciated.

Please don't forget to send the R.D. logs in early as it helps our State and the Contest Manager. While on the subject of contests, the postponed VK5 intrastate contest is on 1st October—this is a reminder. 73, Bart VK5GZ.

REPORTED STOLEN

Yaesu FTDX-400 Serial No. 68111188 whilst under transport from Adelaide to Port Moresby. Information please to VK9EJ, ex-VK5EJ, c/o. P.O. Box 1486, Lae.

AWARDS COLUMN

With Geoff Wilson,* VK3AMK

New Award: The New Zealand Association of Radio Transmitters Inc. (N.Z.A.R.T.) are issuing the **"British Commonwealth Games Award"** to help promote the Commonwealth Games to be held in Christchurch between January 24 and February 2, 1974. The ZM prefix will be available to New Zealand stations from June 3, 1972, until February 2, 1974.

Rules: 1. QSO with one station in Christchurch (venue of 10th British Commonwealth Games) and in addition with one station from each of the four districts in New Zealand—ZM1, ZM2, ZM3, ZM4 **plus** one British Commonwealth station from each of the three I.A.R.U. Regions.

2. Send list of stations contacted (QSLs not required to be held) certified by two other Amateurs with four IRCs to Award Manager, Box 1733, Christchurch, N.Z. Award will be posted by airmail.

3. New Zealand stations may use the prefix ZM instead of ZL during the period 3rd June, 1972, to 2nd February, 1974, and so this will be the duration of the award.

Region I. Countries: England, Gambia, Ghana, Gibraltar, Guernsey, Jersey, Kenya, Malawi, Malta, Isle of Man, Mauritius, Nigeria, Northern Ireland, Scotland, Sierra Leone, Swaziland, Tanzania, Uganda, Wales, Zambia. Region II. Countries: Antigua, Bahamas, Barbados, Bermuda, British Honduras, Canada, Ceylon, Dominica, Grenada, Guyana, Jamaica, St. Vincent, Trinidad and Tobago, Windward Islands. Region III. Countries: Australia, Brunei, Fiji, Hong Kong, India, Malaysia, Papua-New Guinea, Singapore.

AUSTRALIAN D.X.C.C.

Deleted Country: KR6, 8—Ryukyu Islands (Okinawa). D.X.C.C. Credit will only be given for KR6, 8 as a separate country where contacts took place prior to 15th May, 1972. Stations located in the Ryukyu Islands have now been allocated the prefix JR6, U.S. Military personnel will use the prefix KA6. From 15th May, 1972, JR6 and KA6 count as for JA—Japan. All D.X.C.C. members claiming KR6, 8 have had their totals amended accordingly.

"W.A.V.K.C.A." AWARD

The following stations have received this award during the period 1st July, 1971, to 30th June, 1972:

Cert. No.	Call	Cert. No.	Call	Cert. No.	Call
486	ZL4BO	501	G3LPS	515	UK5KAA
487	VE7TL	502	JH1MTR	516	UA6KAE
488	I3RC	503	JA3ARA	517	UT5HP
489	WB6SFA	504	JA0COV	518	UA0LH
490	JA5MG	505	C21AA	519	W3ZUH
491	JA3FD	506	K0IPV	520	SM6BNX
492	JA5YAF	507	ZL2GJ	521	K0PMZ
493	I1SF	508	ZL1AIW	522	SP3DOI
494	VE3FES	509	JA3QOQ	523	LA2B
495	UA0DG	510	UA0FD	524	KL7HDB
496	UF6CR	511	UK2BBB	525	W7JJI
497	UA0DL	512	UW0IQ	526	JA1XIQ
498	UK3AAO	513	UA0ZS	527	JA1FGB
499	DJ4PT	514	UA0ZB	528	ZL3BCJ
500	JH1JGX			529	G3KYF

* 7 Norman Avenue, Frankston, Vic., 3199.

NEW CALL SIGNS

MAY 1972

VK3BL—C. E. Middleton, 7 Shamrock Ave., Cheltenham, 3192.
VK3RD—H. V. Amor, 16 Konrad St., East Bentleigh, 3165.
VK3AFF—J. D. Williamson, 7 Menzie Gr., Ivanhoe, 3079.
VK3AFL—Aust. Air League Lilydale Squad, Community Centre, Castella St., Lilydale, 3140.
VK3AMC—J. R. Caldwell, 5 Frank St., Doncaster, 3108.
VK3AMR—Monash University Radio & Electronics Club, University Union, Monash University, Wellington Rd., Clayton, 3168.
VK3AYH—H. S. Young, 60 Orange St., South Oakleigh, 3167.
VK3AYL—N. J. Boyle, 37 Shakespeare Ave., Preston, 3072.
VK3BGR—G. R. Boyle, 37 Shakespeare Ave., Preston, 3072.
VK3BHP—H. W. Foxon, 1 Mountain Ave., Frankston, 3199.
VK3CCM—L. Morcinek, 374 Balwyn Rd., North Balwyn, 3104.
VK3WIA/R6—Wireless Institute of Australia, Station: Rooks Rd., Vermont, 3133; Postal: 478 Victoria Pde., East Melbourne, 3002.
VK3YGQ—J. J. Sadauskas, 28 Gardenia Rd., North Balwyn, 3104.
VK3YGX—I. M. Wiseman, 1207 Mair St., Ballarat, 3350.
VK3ZAK—Scoutair Bendigo, Londonderry Reserve, Vine St., Bendigo, 3550.
VK3ZGQ—P. W. Duddy, 2/18 Holroyd Ave., Balaclava, 3183.
VK3ZOK—K. F. Baxter, 1A Buttler St., Essendon, 3040.
VK3ZTL—A. J. Cox, 1 Inverell Ave., Syndal, 3149.
VK3ZVE—L. K. Curling, 24 Brougham St., Box Hill, 3128.
VK3ZVJ—J. D. Hunt, 7 Tiffany Ave., Cheltenham, 3192.
VK4AX—A. G. Nunn, 36 Waratah Dr., Clontarf, 4019.
VK4EO—R. S. Rice, 119 Ridge St., Northgate, 4013.
VK4GM—G. L. Adams, 81 North St. Extended, Rockhampton, 4700.
VK4IA—N. J. Walden, 8 Kruger St., Ipswich, 4305.
VK4NE—R. P. Jonasson, 16 Poinciana St., Kingston, 4205.
VK4OK—J. B. Grimes, "Wirra," Banana, 4715.
VK4QI—E. C. Roberts, 38 Amaroo Close, Gleden, Gladstone, 4680.
VK4XH—E. R. Hardman, 226 Broadwater Rd., Mt. Gravatt, 4122.
VK4ZAF—D. I. Marshall, 23 Karowara St., The Gap, 4061.
VK4ZRT—R. G. Grslow, 4 Sneyd St., Mackay, 4740.
VK5IU—K. C. Barroll, C/o. Waikerie Gliding Club, Waikerie, 5330.
VK5LM—L. M. Earl, P.O. Box 23, Mallala, 5502.
VK5LX—M. J. Bloodworth, 16 Pamela Dr., Para Hills, 5096.
VK5NQ—C. R. De Combe, C/o. Superintendent, Reg. & Lic., Eng. Div., 30 Flinders St., Adelaide, 5000.
VK5ZN—C. J. W. Cook, 28 North Pde., Kingswood, 5062.
VK5ZCP—P. L. Christie, 20 James St., Adelaide, 5000.
VK5ZFG—G. C. Fisher, 177 Shepherds Hill Rd., Eden Hill, 5050.
VK5ZTS—T. Scholten, 175 Lacey St., Whyalla, 5600.
VK5ZTW/T—T. J. Lloyd, 21 Somerset Ave., Cumberland Park, 5041.
VK6RQ—R. A. Gray, Station: Admiralty Gulf; Postal: 37 Dudley St., Midland, 6056.
VK6XE/T—W.A. Institute Technology (Dept. Electrical Engineering), Hayman Rd., South Bentley, 6102.
VK6CIL—P. H. Long, Station: Portable; Postal: 150 Woodford Rd., Elizabeth North, S.A., 5113.
VK6ZHR/T—R. K. Henderson, 85 Flora Tce., North Beach, 6020.
VK6ZJK—J. Kemp, 29 Leverburgh St., Ardross, 6153.
VK7ZAQ—G. E. Rand, 185 Tarlton St., East Devonport, 7310.
VK7ZIE—I. E. Ellings, 28 Turton St., Devonport, 7310.
VK9KE—T. J. Fishpool, C/o. P. & T., Burns House, Port Moresby, P.
VK9ZDG—E. Guthrie, P.O. Box 301, Rabaul, N.G.

☆

LICENSED AMATEURS IN VK

MAY 1972

	Full	Lim.	Total
VK0	6	1	7
VK1	92	28	120
VK2	1387	529	1916
VK3	1321	674	1995
VK4	531	207	738
VK5	517	215	732
VK6	364	137	501
VK7	153	67	220
VK8	35	12	47
VK9	90	14	104
Grand Total	4496	1884	6380

SILENT KEYS

It is with deep regret that we record the passing of—

VK2DI—G. F. Cole
VK2FQ—C. H. Collinge
VK3LZ—C. A. Ellis
VK3ZGD—A. C. Stebbing
VK4GG—G. Heilbronn

A DX'ERS NIGHT-TIME MUSE

(or an Insomniac's Lament)

Lo, it is night and half the world sleeps,
In ignorance; but DX sweeps,
Through great spans of space and falls,
Like symphonies from vasty music halls.
A thousand swinging keys discordant bawl,
Greet each stanza from a rare exotic call,
As Hams shout on in passionate ferment,
All this I hear and listen, in content.
Straining ops perform with speed "uptight",
To make their QSOs 'ere day's first light,
Robs them of their sweet and global game,
To which the night gave sound and name.
The cock crows and notes begin to fade,
Into spaces' pre-dawn muted glade.
Like violins tucked away, the signals go,
And I sit alone at the Radio.

—Alan Shawsmith, VK4SS.

HAMADS

- A free service for individual members.
- Four lines of print free (200 characters/spaces); full charge at $6 (min.) per col. inch if exceeded or for repeats: includes name/address—use QTHR if correct in Call Book.
- Copy, please in typescript if possible, and signed.
- Excludes commercial-class advertising.
- Exceptions only by PRIOR arrangement.

For full details see January 1972 "A.R.," page 23.

FOR SALE

Townsville, Qld.: Two 522 Tx VHF 832A. Best offer. 6 Robinson St., Belgian Gardens, 4810.

Oatley, N.S.W.: AR88LF and 20-40-80 mx SSB Tx, 6DQ5 output, full working order, $200 or sell separately. VK2BSG, QTHR, Ph. 57-6705.

Gove, N.T.: Inoue 700 solid state Rx, Tx and 240v. AC/12v. DC PSU/Spkr. unit. Cables and manuals. 1969 model, spare tx tubes. As new. Air freight free to Darwin. $350. Write VK8KG, QTHR.

Rosetta, Tas.: Swan 500, 14XDC/230XAC PSU, 14XDC never used. Neg. earth. Accept Aust. AC PSU suit SW500 part payment. Sell 14XDC separately if necessary. Price, details, VK7TR, 160 Marys Hope Rd., Rosetta, Tas. Ph. 72-5506.

Greenwich, N.S.W.: $525 o.n.o. for Galaxy GT550 with P/S and remote VFO. VK2AGO, QTHR. Ph. (02) 43-2427 A.H.

Hobart, Tas.: Power Transistors OC24 Mullard 15w. PNP, brand new, original packaging, top grade, 60c ea. or five for $2.50. Encl. 7c stamp. Write VK7TA, QTHR.

Townsville, Qld.: Channel Master Antenna Rotator complete including cable and new alignment bearing. Suit v.h.f. beam, $30. VK4FO, QTHR.

Brisbane, Qld.: Collins 75A4 Receiver in almost immaculate condition with instruction book. VK4FP, QTHR.

Sydney, N.S.W.: Three 4CX250B Valves and one socket, $25, as new. Will sell valves separate, $8. VK2ZAH, QTHR, Ph. (02) 47-4421.

Woodlands, W.A.: 3CX100A5/7289 Eimac, brand new, factory sealed pack, $10 plus reg. post. VK6NE, N. Penfold, 388 Huntriss Rd., Woodlands, W.A., 6018. Ph. 092463232.

Melbourne, Vic.: Swan 500C and Power Supply. FLDX-2000 Linear. Ph. Bus. 24-1231, A.H. 20-6135.

Footscray West, Vic.: Trio 9R-59 Rec., 8 tubes, 0.55 - 30 MHz., S meter, ANL, b/spread, Q mult., inst. book, good cond., $60. VK3ZM, QTHR. Ph. 689-3135 (A.H.).

WANTED

Melbourne, Vic.: Johnson Match Box. Also small oscilloscope or home brew device suitable monitoring output signals. Ph. (03) 85-4952 or write 80 Hill Rd., North Balwyn, Vic., 3104.

Glenroy, Vic.: Modulation Transformer with multi-tap prim./sec. and power capacity 80 watts, typically Woden UM2 or UM3. Peter Simpson, VK3ZWG, QTHR. Ph. (03) 306-5456.

Mordialloc, Vic.: A.R.R.L. Handbook 1968, xtal 8161.5 kHz. or near, Hallicrafters S40 or similar. Details and price to VK3ZFI, QTHR, Ph. (03) 90-5347.

Melbourne, Vic.: 1922 (or 1st) call sign list/booklet of VK licensed experimenters and call signs for copying or photocopy thereof. Please contact Business Manager.

For DU7ER, Philippines: Schematic for AMR-101 Rcv. A.W.A., SC-CD-412-44-2352 and PSU 4H13501. Reply to Editor please.

Balaklava, S.A.: Swan 500C with 14-230 AC-DC Power Supply, new or mint condition. State price, model (cash). VK5CY, QTHR.

Melbourne, Vic.: Trio External VFO-5 for TS500 Transceiver. VK3BCY, QTHR. Ph. (03) 848-4775.

Baronga, N.S.W.: Front and/or rear covers for A.W.A. BS50A base station. VK2ZVJ, QTHR.

Geelong, Vic.: FT200 or similar Tcvr. with AC Power Supply. Must be A1 cond. with manual. VK3ANR, QTHR, Ph. (052) 9-8966.

Toukley, N.S.W.: 9 MHz. Crystal Filter with USB and LSB xtals. Also Yaesu sideband generator assy. Will buy or swap for high-band Carphone Jnr. with transistorised PSU or low-band MR20A complete with all accessories. VK2GP, C/o. 23 Yaralla Rd., Toukley, N.S.W., 2263.

Sandringham, Vic.: 2 mx FM Receiver (240v.). Price and information to B. Boyce, 146 Abbott St., Sandringham, Vic., 3191.

Melbourne, Vic.: Oscillator Box BC348, Model R, or BC348-R for wrecking. VK3YAZ, QTHR, Ph. (03) 25-2689.